# BETTER FRUIT

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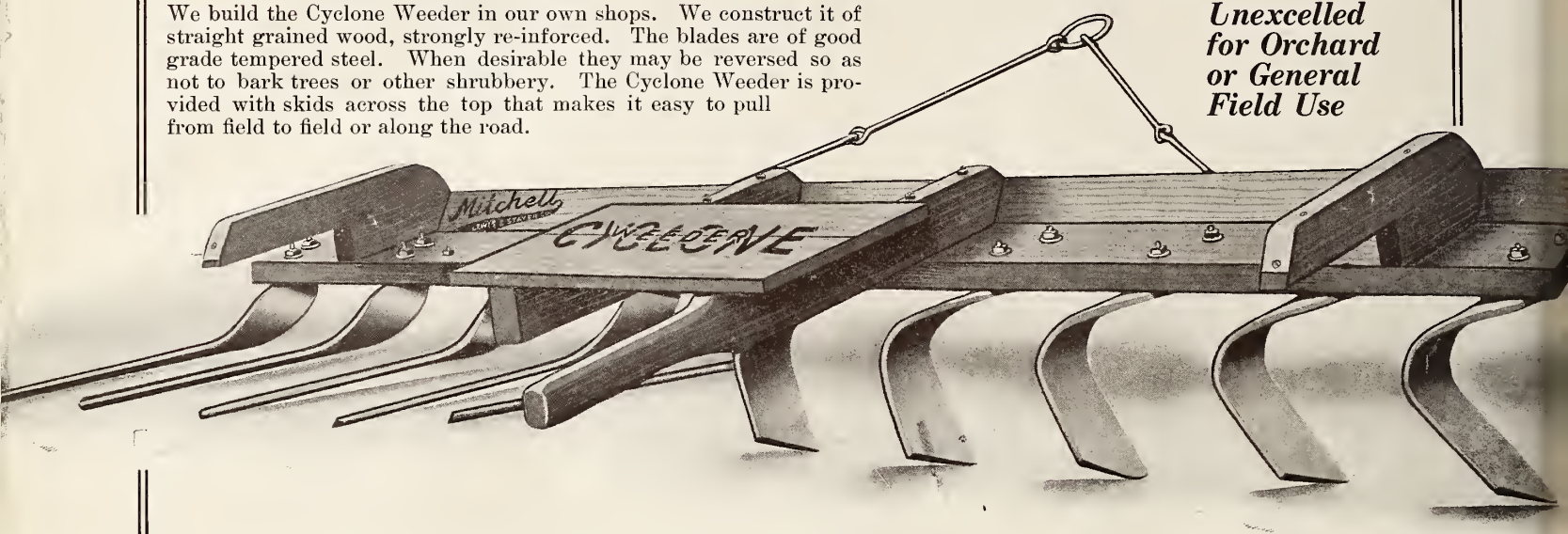


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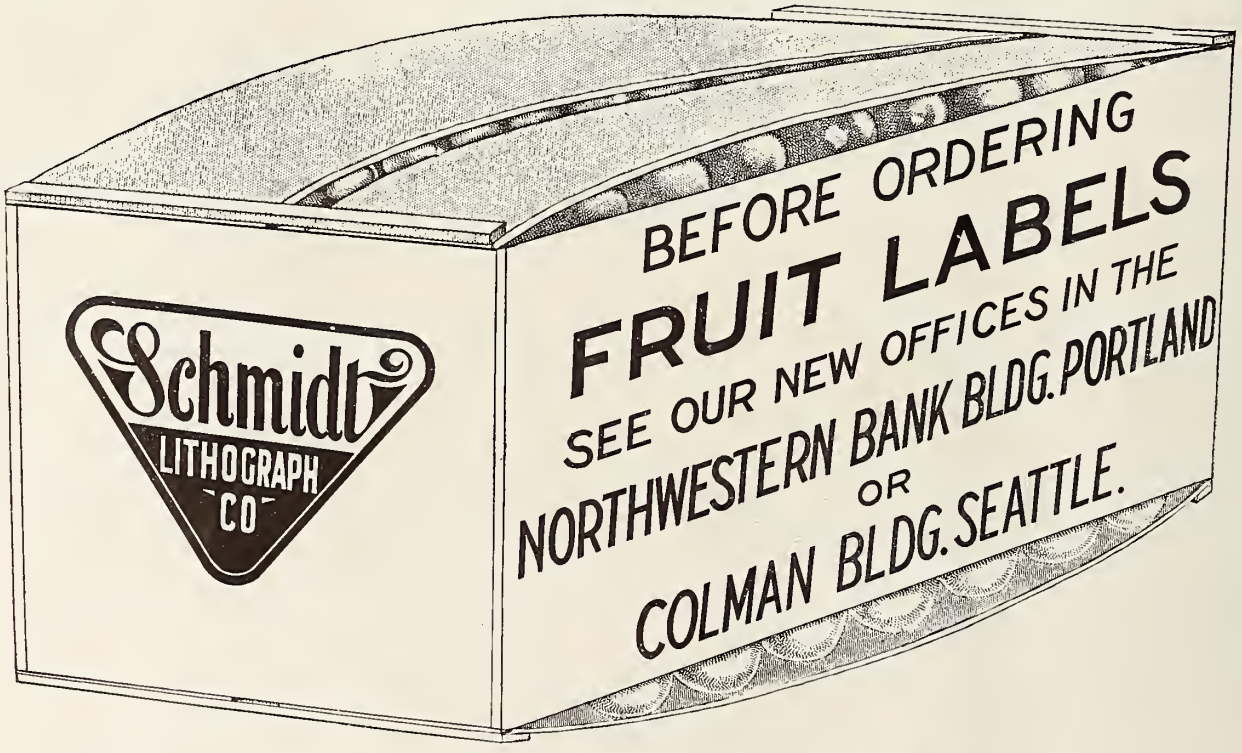


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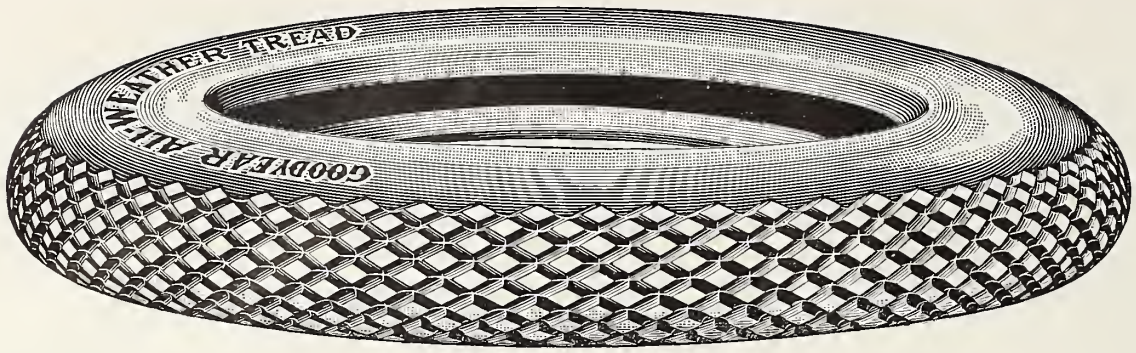


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(1562)

# BETTER FRUIT

AN ILLUSTRATED MAGAZINE PUBLISHED MONTHLY IN THE INTEREST OF MODERN, PROGRESSIVE FRUIT GROWING AND MARKETING

## The Fertilization of Apple Orchards

By John P. Stewart, Experimental Pomologist, Pennsylvania State Experiment Station

WITH orchard fruits, as with many other crops, the first approach to their rational fertilization was made by way of the chemical laboratory. By this means the various parts of the plant were analyzed, their approximate chemical content determined, and from this an estimate was made of the total annual amounts of plant food that were likely to be needed under average conditions. As the number of analyses increased, however, marked variations were observed in the results reported. These variations were naturally due in part to differences in methods of the particular analysts involved, but it was also found that they were frequently and largely due to differences in the stage of growth or maturity of the part when the samples were taken. Losses of mineral constituents due to the action of rain and dew as the plant parts approached or passed their maturity were also found important. Without regard to their causes, however, the evident existence of such variations made it impossible to rely on any single set of analyses for an accurate statement of the average composition of the apple plant. In addition, comparatively little reliance could be placed on the related estimate of its annual requirements. To improve this situation, some time ago the writer collected all the definite reports of apple analyses then available in both America and Europe, reduced them to a common basis, eliminated those evidently abnormal and found the average of the remainder. The results are shown in Table I.

The present averages, derived as they are from more than 200 different sets of analyses made by the leading chemists of two continents, should be a very close approximation to the real average composition of the apple plant. At the same time they should furnish a suitable basis for deriving its approximate annual requirements. To obtain the latter the only additional item needed is an approximation of the annual weights of wood, leaves and fruit that are regularly produced by an acre of mature and vigorous trees. These weights we have estimated at 100 pounds each for the new wood and leaves, and at about 700 pounds or fourteen bushels of fruit for each mature tree. All of them are less than the weights actually observed over a period of years, but they are considered sufficient, since this amount of fruit, e. g., would give an annual production of 490 bushels per acre of 35 trees. Applying the composition figures given in Table I to the present estimates, we find that the total plant-food requirements of an acre of mature apple trees are as shown in Table II. The annual requirements of a 25-bushel crop of wheat have also been added for comparison.

Table II is of interest both in the exhibit of total plant food used and also in its distribution. It should serve to dispel some common erroneous impressions. An excess of iron, e. g., has long been regarded as of special importance in apple production. From the table, however, it appears that the total amount of iron taken up is less than three pounds per acre, and there is probably no agricultural soil that could not furnish much more than this amount in any single season. It is also commonly supposed that wheat requires much more plant food than apples. The present totals, however, show that the annual draft of the latter is distinctly greater in every element except one, and in it the difference is only slight. It is true that apple trees can generally get along on their own resources much better and longer than wheat. But this is doubtless largely due to a number of causes, chief among which are their much longer season of root activity; the more natural mineral demand, especially of the fruit as compared with that of the grain; the annual return of most of the plant food in their leaves and their ability to reduce or entirely eliminate production for one or more seasons when conditions are unfavorable. It is very evident, however, that the total requirements of an active orchard are quite important. Scarcely any soil can meet this demand indefinitely, and unless some proper assistance is given reduced production and off seasons are practically inevitable. Other matters worthy of note are the relatively low plant-food requirements of the wood. Its lime content is rather high, but this is probably largely deposited mechanically by the transpiration stream, and hence is of little physiological importance,—an opinion which is borne out in our field experiments. This relatively low mineral draft of the wood indicates the comparative inefficiency of plant-food additions to trees in the early stages of their growth, and this also is largely borne out by our experiments.

When it comes to the details of fertilization, however, the present data of chemical origin are of less value, and they may be actually misleading. This has been the case especially with the potash. The relatively large amount of this element found in the fruit, for example, has given rise to the common opinion that it is especially needed wherever the fruiting is deficient. As a matter of fact, however, the potash supply has usually proved sufficient in the average orchard soil, and it is generally the other elements,—especially nitrogen and phosphorus,—that have proved to be needed, although they are actually required in considerably smaller amounts. From these facts it is evident that there is comparatively little relation between response and total requirements in the case of plant food, and that something more than a knowledge of the chemical composition of the fruit and wood is needed before one can properly fertilize an orchard. Even with the additional knowledge of the composition of the soil, the problem is not much simplified because it is impossible as yet to duplicate sufficiently the conditions existing in any soil. A chemist may determine the total amounts of plant food present, but he cannot yet determine their actual availability to the trees with sufficient accuracy to be of much value.

The practical and proper fertilization of an orchard, therefore, evidently becomes an experimental problem. The first stage of this problem involves general experiments for the purpose of developing the most promising application for general use, where fertilizers seem to be needed. This general formula can then be adjusted to the exact needs of the particular orchard involved by means of a local testing plan. Experiments of this general character have been in operation under the writer's direction at the Pennsylvania Experiment Station since 1907. Altogether these experiments involve

### Features of this Issue

ten soil types, twelve different locations, over 2,600 trees of practically all ages up to forty-two years, and more than 42,000 bushels of fruit in the last six years. Their general plan may be seen in the tables given herewith. The materials indicated in the various plats have all been applied annually. The rates of application were 50 pounds per acre of actual nitrogen, 100 pounds of phosporic acid and 150 pounds of potash. The manure is applied at the rate of 12 tons to the acre and the lime at the rate of 1,000 pounds per acre. About half the nitrogen has been carried in nitrate of soda and the other half in dried blood. The phosphorus has been carried chiefly in acid phosphate, with "floats," and recently basic slag, used in certain plats for comparison. The potash has been carried chiefly in the muriate, with high-grade sulphate, and recently the low-grade sulphate or "double manure salts," used for comparison in certain treatments. In a number of cases such as the Johnston and Brown experiments, referred to below, the fertilizers were not cultivated into the soil, but were simply spread broadcast over the surface and left to be carried down by the rains. In other cases, such as the Tyson experiment, they have been regularly cultivated into the soil, and in still other experiments bearing more particularly on the influence of cultural methods, we have made direct comparisons of these two methods of fertilizer application. All the fertilizers have been added somewhat after the petals had fallen, but the manure has been applied at any time during the spring. These applications were naturally designed at the beginning of the experiments on the best evidence then available. The amounts and proportions of the different ingredients that we now advise for general use are indicated later.

Beginning with the very young trees—those specially planted for the purpose—and without entering into the exact figures, we may say that in general the conservation of moisture has been more important during the first five or six years of growth than any kind of plant-food applications. This is rather natural in view of the relatively low mineral content of wood, and also in view of the fact that moisture and carbon dioxide play such an important part in its formation. Such benefits as have been secured, however, have come almost entirely from the nitrogen and phosphorus applied. With increase in the age of the trees, however, and especially with the advent of fruit production or the "cropping strain" in addition to the other demands upon the soil, the influence of plant-food applications has generally increased. This may be seen especially in the results secured in our experiment 338, located in the Johnston orchard in Lawrence County, north of Pittsburg. This experiment is on Baldwin trees now 25 years of age and located on a Volusia silt loam. On first inspection these trees did not seem to

TABLE I—THE COMPOSITION OF APPLE WOOD, LEAVES AND FRUIT

Averaged from 87 German and 130 American analyses and reduced to the dry-substance basis.

| | Plant part | Dry substance | Nitrogen (N) | Phos. acid ($P_2O_5$) | Potash ($K_2O$) | Lime (CaO) | Magnesia (MgO) | Iron ($Fe_2O_3$) |
|---|---|---|---|---|---|---|---|---|
| | | Pct. | Pct. | Pct. | Pct. | Pct. | Pct. | Pct. |
| Average of American and German averages | Wood | 52.25 | .627 | .2023 | .3672 | 1.636 | .2397[2] | .0322[2] |
| Values suitable for use in computations | Wood | 52 | .62 | .20 | .36 | 1.6 | .24 | .03 |
| Average American and German averages | Leaves | 34.45 | 2.149 | .4451 | 1.3484 | 2.476 | .7542 | .12472 |
| Values suitable for use in computations | Leaves | 34 | 2.15 | .44 | 1.34 | 2.48 | .75 | .125 |
| Average of American and German averages | Fruit | 15.39 | .4258 | .1693 | 1.1075 | .0843 | .08692 | .0192 |
| Values suitable for use in computations | Fruit | 15.4 | .43 | .17 | 1.10 | .08 | .09 | .02 |

[2] Based on American analyses only.

TABLE II—THE RELATIVE PLANT-FOOD DRAFT OF APPLES AND WHEAT

In pounds per acre annually, based on the composition indicated in Table I.

| | Wood | Leaves | Fruit | Apple (Total) | Wheat Grain | Wheat (Total) |
|---|---|---|---|---|---|---|
| | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. |
| Estimated annual weights | 3,500 | 3,500 | 24,500 | 31,500 | 1,500 | 4,200 |
| Nitrogen (N) | 11.3 | 25.6 | 16.2 | 53.1 | 30.0 | 43.7 |
| Phosphoric acid ($P_2O_5$) | 3.6 | 5.3 | 6.4 | 15.3 | 10.0 | 15.8 |
| Potash ($K_2O$) | 6.6 | 15.9 | 41.5 | 64.0 | 9.8 | 26.8 |
| Lime (CaO) | 29.1 | 29.5 | 3.0 | 61.6 | 0.84 | 8.0 |
| Magnesia (MgO) | 4.4 | 8.9 | 3.4 | 16.7 | 3.0 | 6.1 |
| Iron ($Fe_2O_3$) | 0.5 | 1.5 | 0.8 | 2.8 | .... | .... |

TABLE III—INFLUENCE OF FERTILIZATION ON YIELD (JOHNSTON ORCHARD)

Yields in pounds per plat and in bushels per acre, 1908-1913.

| Plat | Treatment | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | Tot'ls last 5 yrs. | Av. annu'l yield pr. acre | Annual gain over av. check* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | bu. | bu. pr. acre |
| 1. | Check (unfertilized) | 90 | 675 | 2575 | 283 | 1024 | 1210 | 5767 | 138.4 | .... |
| 2. | Nitrogen and phosphorus | 528 | 6018 | 3265 | 7563 | 1225 | 3563 | 21634 | 519.2 | 348.7 |
| 3. | Nitrogen and potash | 237 | 5257 | 1822 | 7816 | 696 | 3489 | 19080 | 457.9 | 287.4 |
| 4. | Check | 446 | 1932 | 3168 | 617 | 1382 | 1777 | 8876 | 213.0 | .... |
| 5. | Phosphorus and potash | 57 | 3089 | 3552 | 1227 | 1385 | 1207 | 10460 | 251.0 | 80.5 |
| 6. | Nitrogen, phosphorus and potash | 759 | 6621 | 2108 | 8209 | 189 | 2320 | 19447 | 466.8 | 296.3 |
| 7. | Check | 211 | 2008 | 1629 | 1362 | 1226 | 1635 | 7860 | 188.6 | .... |
| 8. | Manure | 278 | 3531 | 6149 | 4874 | 6698 | 1314 | 22566 | 541.3 | 370.8 |
| 9. | Lime (and fertilizer, 1912) | 558 | 1216 | 3185 | 388 | 741 | 2174 | 7704 | 184.8 | 14.3 |
| 10. | Check | 106 | 1266 | 3505 | 106 | 474 | 578 | 5929 | 142.3 | .... |

* The average check has yielded 170.5 bushels per acre annually.

TABLE IV—INFLUENCE OF FERTILIZERS ON YIELD (BROWN ORCHARD)

Yields in pounds per plat, 1908-1913.

| Plat | Treatment | 1908 | 1909 | 1910 | 1911 | 1912 | 1913 | Totals | Benefit over norm'l | Annual gain over av. check* |
|---|---|---|---|---|---|---|---|---|---|---|
| | | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | lbs. | Pct. | bu. pr. acre |
| 1. | Check (unfertilized) | 2102 | 25 | 4052 | 1588 | 453 | 3155 | 11675 | .... | .... |
| 2. | Nitrogen and phosphorus | 4153 | 588 | 5920 | 2219 | 7281 | 1170 | 21331 | 136.2 | 289.3 |
| 3. | Nitrogen and potash | 3079 | 78 | 3838 | 1567 | 5402 | 963 | 14927 | 133.6 | 198.9 |
| 4. | Check | 754 | 9 | 470 | 1260 | 309 | 942 | 3744 | .... | .... |
| 5. | Phosphorus and muriate | 1014 | 252 | 2381 | 1643 | 616 | 1501 | 7407 | 62.4 | 70.4 |
| 6. | Phosphorus and sulphate | 292 | 266 | 1368 | 1299 | 356 | 1509 | 5090 | −5.3 | 6.4 |
| 7. | Check | 254 | 192 | 1115 | 1568 | 1117 | 1949 | 6195 | .... | .... |
| 8. | Nitrogen, phosphorus and potash | 1219 | 454 | 2436 | 3241 | 4931 | 1369 | 13650 | 122.5 | 206.1 |
| 9. | Nitrogen | 863 | 1575 | 120 | 3082 | 1614 | 2721 | 9975 | 64.3 | 120.3 |
| 10. | Check | 458 | 515 | 787 | 1418 | 222 | 2583 | 6013 | .... | .... |
| 11. | Acid phosphate | 104 | 892 | 787 | 794 | 64 | 2910 | 5551 | 5.2 | 17.1 |
| 12. | Raw phosphate | 100 | 124 | 581 | 703 | 123 | 3184 | 5815 | 2.1 | 23.3 |
| 13. | Check | 266 | 257 | 2096 | 498 | 727 | 1692 | 5536 | .... | .... |
| 14. | Manure | 621 | 1947 | 778 | 7334 | 1117 | 2422 | 14219 | 212.2 | 219.4 |
| 15. | Lime (and fertilizer, 1912) | 152 | 160 | 1029 | 1060 | 288 | 2643 | 5332 | 49.3 | 12.0 |
| 16. | Check | 246 | 36 | 943 | 387 | 166 | 813 | 2591 | .... | .... |

* In plats 2 and 3, the average gains over the "normal production" are given on account of the unusual conditions near plat 1. Their annual yields were 497.7 and 348.3 bushels per acre respectively. The average check, omitting No. 1, has yielded 4,816 pounds per plot, or 112.4 bushels per acre annually.

be suffering especially from any cause, but they had not been bearing satisfactorily and their annual twig growth was averaging scarcely an inch, with occasional maximum growths of five or six inches. These growth rates are still apparent on the checks, or unfertilized plats, but they have been practically trebled on the plats receiving proper fertilization. The influence of the different applications on yield may be seen in Table III. In this and the other tables which follow the yields of the first year are uniformly excluded in the final averages because they can never be materially affected by the applications of the same season.

The abnormally late frosts of 1913 injured the yields of that year very severely, and the injury was especially heavy on the effectively fertilized plats. This was because it was the full year for them and their amount of bloom was fully 100 per cent, while that of the other plats scarcely averaged 30 per cent. Notwithstanding this temporary loss, however, in the total results shown in the last two columns, we find some very marked responses to certain types of fertilization. The large increases invariably have followed the nitrogen. This is true regardless of whether it is applied in manure or commercial forms, and it is especially evident in a comparison of plats 5 and 6. The mere addition of nitrogen to the fertilization of the latter plat has more than trebled the increase in yield, and the differences in foliage and growth have been fully as marked. The growth on the phosphate and potash plats in reality is running about 3 per cent under the normal, while its foliage is practically identical with that of a check. On all the plats receiving nitrogen, however, the foliage is very much greener and more abundant, and their average growth is ranging from 25 to 90 per cent above the normal. Phosphorus is next in im-

TABLE V—INFLUENCE OF FERTILIZATION ON YIELD AND GROWTH IN EXPERIMENT 215 (TYSON ORCHARD)

(Yield in pounds per plat, 1908-1913)

| Plat Treatment | 1908 lbs. | 1909 lbs. | 1910 lbs. | 1911 lbs. | 1912 lbs. | 1913 lbs. | Total lbs. | Benefit over normal % | Gain over av. check* 4 years bu. per A. | Growth, gain over normal 6 years % |
|---|---|---|---|---|---|---|---|---|---|---|
| 1. Check (unfertilized) | 14 | 95 | 346 | 2053 | 549 | 3990 | 6947 | .... | .... | .... |
| 2. Nitrogen and phosphate | 26 | 73 | 301 | 2277 | 464 | 4645 | 7786 | 14.6 | 34.5 | 7.4 |
| 3. Nitrogen and potash | 43 | 115 | 418 | 3043 | 542 | 5264 | 9425 | 41.8 | 68.4 | 17.7 |
| 4. Check | 21 | 54 | 260 | 1555 | 719 | 3886 | 6495 | .... | .... | .... |
| 5. Phosphate and muriate | 26 | 146 | 476 | 2828 | 495 | 5178 | 9049 | 45.4 | 59.0 | 8.1 |
| 6. Phosphate and sulphate | 61 | 179 | 483 | 2352 | 975 | 4110 | 8160 | 37.1 | 36.0 | 2.3 |
| 7. Check | 18 | 45 | 235 | 1777 | 862 | 2740 | 5677 | .... | .... | .... |
| 8. Complete fertilizer | 21 | 74 | 300 | 2885 | 190 | 5132 | 8602 | 49.7 | 50.2 | 12.7 |
| 9. Nitrogen | 17 | 83 | 229 | 1746 | 551 | 4159 | 6785 | 17.8 | 6.5 | 7.9 |
| 10. Check | 17 | 89 | 150 | 1579 | 504 | 3547 | 5886 | .... | .... | .... |
| 11. Acid phosphate | 3 | 43 | 153 | 1359 | 655 | 3891 | 6104 | —3.4 | —8.4 | 4.4 |
| 12. Raw phosphate | 4 | 62 | 164 | 2010 | 842 | 3825 | 6907 | 2.2 | 9.1 | 0.8 |
| 13. Check | 31 | 46 | 103 | 1886 | 615 | 4511 | 7192 | .... | .... | .... |
| 14. Manure | 15 | 52 | 190 | 2333 | 262 | 5363 | 8215 | 16.3 | 41.3 | 14.6 |
| 15. Lime (and fertilizer) | 27 | 86 | 186 | 1765 | 1113 | 3620 | 6797 | —2.0 | 6.5 | —1.6 |
| 16. Check | 10 | 76 | 115 | 1922 | 739 | 3947 | 6809 | .... | .... | .... |

*The average check equals 6,501 pounds for six years and 6,415 pounds for last four years, or 154 bushels per acre for last four years.

TABLE VI—INFLUENCE OF FERTILIZER ELEMENTS ON APPLES

Average benefits over the normal results without fertilization, 1908 to 1912

| (a) Experiments 215, 216 and 220 | Yield Per Cent | Color Per Cent | Size Per Cent | Growth Per Cent |
|---|---|---|---|---|
| Nitrates in combination | 62.7 | —11.6 | —0.7 | 10.43 |
| Nitrates alone | 32.5 | —12.7 | —4.3 | 15.51 |
| Phosphates in combination | 20.2 | —2.1 | 0.3 | 2.28 |
| Phosphates alone | —10.7 | 2.7 | —0.6 | 2.45 |
| Potash in combination | 15.1 | 3.2 | 5.8 | 3.67 |
| Complete fertilizer | 78.3 | —15.4 | 5.2 | 17.67 |
| Manure | 75.9 | —11.4 | 5.8 | 29.07 |
| Lime alone | —8.24 | —0.3 | —2.0 | 6.31 |
| (b) Experiments 336, 338 and 339 | 1908-12 | 1909-12 | 1909-12 | 1908-12 |
| Nitrates in combination | 74.5 | —12.7 | —0.4 | 27.00 |
| Phosphates in combination | 33.5 | —2.8 | 4.9 | —0.23 |
| Potash in combination | —3.6 | 1.4 | 7.1 | 2.79 |
| Complete fertilizer | 80.5 | —15.6 | 5.2 | 29.63 |
| Manure | 168.8 | —15.9 | 25.2 | 37.34 |
| Lime alone | 29.8 | —5.4 | 15.9 | 15.48 |

TABLE VII—A GENERAL FERTILIZER FOR APPLE ORCHARDS

(Amounts per acre for bearing trees)*

| *Nitrogen* | *Phosphoric Acid* | *Potash* |
|---|---|---|
| 30 lbs. (N) | 50 lbs. ($P_2O_5$) | 25 to 50 lbs. ($K_2O$) |
| Carried in: | Carried in: | Carried in: |
| 100 lbs. Nitrate and 150 lbs. Dried blood; or in Two successive applications of nitrate. | 350 lbs. Acid phosphate; or in 200 lbs. Bone meal; or in 300 lbs. Basic slag. | 50 to 100 lbs. Muriate; or in 100 to 200 lbs. low grade Sulphate. |

*For young orchards, reduce these amounts in proportion to area covered.

portance here, as indicated by the much larger yield where it is combined with nitrogen. It is also shown by the deficit in plat 3 as compared with 6, when the phosphorus is omitted in the former. Potash, however, has been of no value in this orchard, as shown in plats 2 and 6. In fact its addition in the latter plat has actually resulted in a deficit, though this may be due to other causes. Lime also has been of no value, when applied alone, and it is only through the influence of the fertilizer, begun in 1912, that this plat is now able to show more than a deficit. The manure naturally is showing up well, because it is essentially a nitrogenous fertilizer plus a mulch. Its phosphorus also has apparently been of value in some cases, but its potash has not shown much effect as yet,—not even in those cases where this element has proved to be needed. A single experiment, however, is not sufficient to decide the general fertilization of orchards. The results of single experiments naturally may be typical and true responses to the particular influences in operation, but one can never be sure of this unless he has sufficient duplication in both experiments and results to actually prove it. For this reason we shall call attention to the results of a similar but larger experiment in another part of the state.

Results From the Brown Orchard.—This experiment is located in Bedford County on DeKalb stony loam,—a residual, foothill soil, chiefly of sandstone origin, which is widely used for orchard purposes. This soil had been cropped rather heavily before the orchard was planted. The trees are York Imperial, now 25 years old. They had borne some good crops before the experiment was started, but they were no longer bearing well except on occasional trees, and their annual twig growth was very small,—averaging scarcely half an inch. This rate of growth also has been greatly increased by the proper fertilization. This experiment involves the same treatments as those in the Johnston orchard and four others besides,—those in plats 6, 9, 11 and 12. It was started in 1907, and the results of that season are excluded in the present table for the reason stated above. The results for the past six years are given in Table IV.

In general, we again find the same types of results here as in the preceding experiment, viz., large gains from nitrogen, phosphorus and manure, with relatively small effects from potash, and again no advantage at all from lime, as it regularly showed a deficit until the fertilizer was started in 1912. Incidentally it may be noted that there are greater irregularities in this experiment, owing somewhat to its greater size, but chiefly due to the presence of a woods on the mountainside above the first check plat, from which the latter is separated by a single row of trees. The leachings from the floor of the woods have acted much like a nitrogen fertilizer, and as a result the trees nearest the woods, although of the same age as those farther down, are considerably larger, thus accounting for the greater yields of the first two or three plats. This influence practically disappears, however, before the fourth plat is reached, as shown by its low yields, which are those of a typical check. The differences that appear in the last two columns are due partly to these irregularities, partly to a certain amount of leaching and cross-feeding in the case of some of the checks in spite of separating rows below each treated plat, and partly to a different method of calculation. In one column the benefit is figured on the basis of the normal production of the immediate plat concerned, which method is supposed to eliminate soil irregularities to the greatest possible extent. When the adjacent checks are being benefited by leachings or cross-feeding, however, this method fails to show the full benefit due to the treatment. The average check itself is not entirely free from the cross-feeding influences, since it only distributes their extra yields, and hence it is probable that some of the benefits indicated in the last column are still lower than they should be.

In the results themselves, nitrogen is evidently the first limiter, as its application alone in plat 9 has resulted in an annual increase of 120 bushels per acre, which is much the best increase received from any single element. Where phosphorus is added to it, however, as in plat 2, this gain is more than doubled,—a result partly due to the greater size of the trees there, but doubtless largely due to the probable fact that the need of phosphorus is next in importance after that of nitrogen. The addition of phosphorus alone, however, has proved of no avail, either in the acid phosphate or "floats" of plats 11 and 12, and the slight gains now shown there are due to the "completion" of their fertilization in 1912 by the addition of nitrogen and potash. Potash itself is again of little or no avail, as indicated by a comparison of results in plats 2 and 8, though the actual deficit in the latter is very largely due to differences in the size of the trees,—a difficulty which is partly overcome in the next to the last column. As to carrier, the muriate has given the better results so far, and this is also true of all our similar comparisons. This fact, together with its lower cost and lesser tendency to "cake" in the mixtures, has therefore given it the preference over the sulphate for orchard fertilization at least.

Contrary to a common impression, the time required for results to appear has been surprisingly short in both these experiments. Both the value of fertilization and the elements especially needed were quite evident by the close of the second season, and the general conclusions formed then have not been materially changed since. In younger or non-bearing orchards, or in those having some limiter other than plant food, this result naturally would not have come so promptly. Another fairly common impression is that the

influence of fertilizers is transient and that, even where favorable at first, their effect soon wears out and may leave the soil worse than before. This impression evidently finds no support in the results here, where definite plant foods are being supplied. On the contrary, it is a notable fact that in the Brown orchard in 1912, the sixth year of the experiment, the effects of fertilization were greater than ever before, and similar results are observable in our other experiments.

Results in the Tyson Orchard.—In the experiments above we have noted large annual gains resulting from certain fertilization, particularly that rich in nitrogen and phosphorus. In these cases also the gains from potash were relatively small or entirely absent, and from our other experiments this seems to be the more common condition in the average orchard. In another experiment in Adams County, however, we have practically the reverse conditions so far as the yields are concerned. The trees in the latter experiment are much younger, being now but fifteen years of age. The soil is a relatively heavy silt loam, and tillage and annual cover crops have been maintained near the trees practically uniformly since the orchard was started. The annual growth and general appearance of all the trees in this experiment are considerably better than those of the average check trees in the preceding experiments. Practically no fruit had been borne by these trees when our experiment was started in 1907, and there have been but two fairly full crops since then,—those of 1911 and 1913. The treatments are the same as those in the Brown experiment and the results are shown in Table V.

The relative youth of these trees makes both their yields and differences much less than those in the preceding experiments. With increasing age, it is probable that some of the results may be different, especially in view of the relative growth that is now being made under the different treatments. At present, however, certain facts are of interest. In the first place, the comparative failure here of both manure and nitrogen is quite remarkable. The regular annual application of twelve tons of stable manure, in this case, has resulted in an annual gain of only about forty bushels of apples per acre. During the same time nitrogen alone has shown almost no gain, and nitrogen and phosphates, which were so effective in the preceding experiments, here show an annual gain of only 34.5 bushels per acre,—but little more than enough to pay for the treatment. Potash, on the other hand, in direct contrast to its effect in the experiments above, here shows a distinct gain in yield wherever it is applied. The best of these gains,—the one in combination with nitrogen,—is only 68.4 bushels per acre annually, but this is more than a 40 per cent increase over the normal yield for the plat, and it shows a fair profit over the cost of treatment, besides giving over 17 per cent of an increase in growth. Potash applications,

Nitrogen and Phosphates vs. Nothing, in Brown Orchard. The fertilized trees, to the left, have averaged 498 bushels per acre annually for six years. Their normal unfertilized yield for the same period was 208 bushels.

therefore, have evidently been of value in this orchard, even when those of manure and of nitrogen and phosphates were largely failing.

The Action of Manure vs. That of Commercial Fertilizers. — The above facts, taken in connection with those shown in the two earlier experiments, indicate that the plant-food action of manure is practically identical with that of a commercial fertilizer rich in nitrogen and phosphates. It also apparently indicates that the potash in the manure may be less readily available than that carried in commercial forms. The old controversy over the relative value of manure and commercial fertilizers, therefore, is without any particular significance so far as plant food is concerned. Either type of fertilizer may be successful or either may be a failure, depending upon the particular conditions involved. The manure, however, often has some additional value as a mulch. This naturally cannot be duplicated by commercial fertilizers alone, though it may be duplicated by any other kind of mulch, as has been shown especially in our experiment in the Mynard orchard in Bradford County, and also in most of our cultural-method experiments. The matter of availability also is often important, as manure cannot always be secured, and it is for this reason that the relation between manure and nitrogenous fertilizers should be well understood. Moreover, large and regular applications of manure sometimes results in a distinct increase in the amount of blight, besides unduly increasing the size of the fruit and the amount of punky pitting in its flesh. In such cases a reduction in the applications or a partial or complete substitution of a proper commercial fertilizer is advisable.

It is evidently impossible in the present space to consider all our experiments singly or in detail. It is desirable, however, to present a brief summary of the fertilizer influences shown in six of the experiments, including the three just considered. This summary shows the average influences of the various fertilizer elements, as nearly as they can be calculated, on the four most important characteristics of apples, viz., their yield, color, average size and amount of wood growth. The relative values of the different elements during a five-year period, in terms of benefit over the normal results that would have been obtained without fertilization, are shown in Table VI. Without going into details, it may be noted that the yields have been very materially benefited by certain fertilization. In general also the same influences that have materially increased the yields have similarly increased the growth. In other words, our best growing plats have as a rule been our best fruiting plats. On sound, healthy trees this will generally be the case unless either occurs to an abnormal extent, in which case the other may be somewhat reduced. Mild injuries may also stimulate yields at the expense of growth, and thus obscure the general rule. In Table VI the most marked exception to the present rule appears in the case of the phosphates, especially in the lower section of the table. This may be connected with the fact that old wood especially is very low in phosphoric acid, as shown in Tables I and II, and our present definite growth determinations are based upon increase in trunk girth alone. On twig growth, however, our observations indicate that phosphate additions have been very helpful, particularly in the Brown orchard, a fact which tends to bring it in line with the general rule just stated.

The Control of Average Size.—So far as fertilization is concerned, manure

Continued on page 34

Effect of the general fertilizer recommended in Table VII. Tompkins King and other varieties showing the value of our general orchard fertilizer in other parts of the Johnston Orchard. These trees had not borne well before fertilization, but this is their third successive crop.

# Cost and Location of Earth Roads

[Information Bureau, United States Department of Agriculture]

THE cost of hauling over country roads is largely determined by the size of the load that can be hauled, the number of trips that can be made in a day and the wear and tear on teams and equipment, according to the Office of Public Roads, Department of Agriculture. Steep grades as well as ruts and mudholes serve to decrease both the speed and the load. On the principle that a chain is no stronger than its weakest link, the maximum load that a team can draw is the load that it can draw up the steepest hill or through the deepest mudhole on that road.

Wherever possible roads should be located on straight lines between terminal points. In hilly or mountainous country, however, the attempts to keep roads straight between terminals often leads to the serious error of heavy grades. Straightness and grade must therefore be handled together. The best location is one which is straight in general direction, is free from steep grades, is located on solid ground and serves the largest possible number of people. Roads should be located for the benefit of the public as well as the private landowner. The elimination of one or two steep hills on a line of road will frequently enable horses to draw three or four times as much as they could draw on the old road. It takes approximately four times as much power to draw loads up 10 per cent grades (10 feet vertical in 100 feet horizontal) as on a level, but on a 4 per cent or 5 per cent grade a horse can usually draw (for a short time) as much as he can draw on a level. A 4 per cent grade is therefore considered the maximum on roads subject to heavy hauling. Many steep grades may be avoided by locating the road around instead of over the hill,—the handle of the bucket is no longer when held in a horizontal position than in a vertical. By going around we avoid two steep hills.

If the road must pass up a steep hill or mountainside, the steepness of the grade may be decreased by increasing the length of the road. In other words, eliminate steep grades by locating the road on curved or zigzag lines, and not in a straight line from the bottom to the top of the hill. These curves should be carefully plotted and the straight stretches located with an instrument. This improves the looks of the road and does not add materially to its cost. In studying the relation of grade to distance the following calculation is interesting: To lift a ton one foot high requires 2,000-foot pounds of energy; on a road the surface of which offers 100 pounds of tractive resistance per ton the same energy would roll the ton a horizontal distance of twenty feet. To save one foot of grade the road may therefore be lengthened twenty feet.

Roads should never be located so close to stream beds as to be subject to overflow or on ground which is constantly damp and marshy. The earth road should have at least six hours of sunshine each day. This can be secured either by locating the road with southern or western exposure, or by having such brush and trees as impede the drying action of the sun and wind removed. With gravel and stone roads this is not necessary, as a certain amount of moisture is needed on such roads, especialy in the summer time. Relocating roads is not an engineering problem alone. One must also consider the effect of the road on those who now live upon it. Many farmers dislike to have the road placed back of the house or out of sight of it. It requires tact and good judgment to secure a suitable location without arousing harsh antagonism.

## Spring Pruning

A great many questions have come to the Experiment Station lately relative to how late apple, peach and pear trees could be pruned in the spring. The pruning can be done with entire success at any time during the spring months. It is usually a little more successful and satisfactory to do the work before growth starts in the spring, but the pruning should not be delayed a year on account of the inability of the manager to do the work at an early season. The later the pruning is done in the spring the stronger is the tendency toward the checking of growth, or, if it does not do this, it will be less stimulative on wood growth and result in accomplishing no more than simply the removal of the wood that has been cut away. In some cases the latter may be highly desirable.

Wounds made on large branches sometimes "bleed" when made in the middle of the rapid-growing season. It seems, however, that there are other conditions more influential in causing the bleeding of wounds than the mere date of cutting. If pruning is done after growth starts more care should be exercised to paint the wounds. If bleeding takes place so that paint will not cover the wound well, then the wound should be scraped and well painted and soaked with a disinfectant like bordeaux mixture or the corrosive sublimate. If this is done these bleeding wounds will not serve as sources of infection or spread of pear blight and other diseases.—O. M. Morris, Horticulturist, Washington State Experiment Station.

A typical fertilized tree of plot 8 in the Brown Orchard. When photographed, in 1912, this tree carried 26.6 bushels of fruit, while the best unfertilized tree in the experiment yielded only 7.9 bushels

# Prices and Receipts of Apples in New York City for 20 Years

By H. B. Knapp, Experiment Station, Cornell University

TABLE I—MONTHLY AND YEARLY RECEIPTS OF APPLES IN NEW YORK CITY (IN BARRELS*), 1893-1913

| | August | September | October | November | December | January | February | March | April | May | June | July | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1893-1894 | 4,632 | 20,461 | 57,068 | 66,160 | 25,678 | 18,692 | 15,462 | 12,451 | 8,845 | 5,414 | 971 | 1,430 | 237,264 |
| 1894-1895 | 17,046 | 33,800 | 125,000 | 159,527 | 58,419 | 33,032 | 27,942 | 36,522 | 24,608 | 10,442 | 2,193 | 20,177 | 548,708 |
| 1895-1896 | 33,510 | 75,394 | 152,419 | 164,463 | 110,638 | 50,327 | 58,782 | 45,293 | 30,209 | 13,955 | 1,497 | 12,017 | 748,504 |
| 1896-1897 | 51,947 | 188,135 | 263,491 | 273,052 | 165,494 | 115,096 | 134,113 | 125,945 | 74,936 | 24,654 | 9,683 | 19,813 | 1,446,359 |
| 1897-1898 | 38,713 | 71,433 | 203,538 | 196,477 | 81,695 | 70,649 | 62,560 | 71,913 | 47,521 | 25,532 | 7,046 | 5,396 | 882,473 |
| 1898-1899 | 30,428 | 76,807 | 161,876 | 117,608 | 89,251 | 49,578 | 37,323 | 36,752 | 33,148 | 16,368 | 1,547 | 11,276 | 661,962 |
| 1899-1900 | 47,918 | 102,955 | 206,216 | 185,785 | 113,277 | 75,164 | 72,156 | 60,291 | 38,498 | 16,528 | 2,860 | 3,517 | 925,165 |
| 1900-1901 | 23,116 | 82,426 | 176,411 | 189,521 | 101,193 | 99,087 | 69,548 | 69,917 | 55,282 | 25,959 | 3,507 | 5,443 | 901,410 |
| 1901-1902 | 18,379 | 53,611 | 127,191 | 106,371 | 57,021 | 51,597 | 36,013 | 36,671 | 43,463 | 18,328 | 5,171 | 10,576 | 564,392 |
| 1902-1903 | 68,007 | 154,475 | 287,936 | 255,942 | 166,971 | 130,626 | 122,687 | 160,567 | 96,626 | 62,503 | 33,665 | 23,721 | 1,563,726 |
| Yearly average for 10 years. | 33,370 | 85,950 | 176,115 | 171,491 | 96,964 | 69,385 | 63,659 | 65,632 | 45,314 | 21,968 | 6,814 | 11,337 | 847,996 |
| 1903-1904 | 95,142 | 246,684 | 435,950 | 399,130 | 193,206 | 144,919 | 165,102 | 166,698 | 108,761 | 56,203 | 31,811 | 8,016 | 2,051,622 |
| 1904-1905 | 85,332 | 284,112 | 309,135 | 337,336 | 168,721 | 143,071 | 122,565 | 193,460 | 130,367 | 70,923 | 20,437 | 22,236 | 1,887,695 |
| 1905-1906 | 143,052 | 252,056 | 367,638 | 281,482 | 152,945 | 119,309 | 82,084 | 80,466 | 49,034 | 27,802 | 10,987 | 7,688 | 1,574,543 |
| 1906-1907 | 174,637 | 255,600 | 478,323 | 413,566 | 223,554 | 223,469 | 145,847 | 173,133 | 87,412 | 39,442 | 12,594 | 1,917 | 2,229,494 |
| 1907-1908 | 60,488 | 137,729 | 350,529 | 364,490 | 171,099 | 168,649 | 117,938 | 160,210 | 108,194 | 75,719 | 33,162 | 13,839 | 1,762,046 |
| 1908-1909 | 121,641 | 310,289 | 447,895 | 337,580 | 217,601 | 137,683 | 92,688 | 87,198 | 61,486 | 32,369 | 11,837 | 5,470 | 1,863,737 |
| 1909-1910 | 64,305 | 183,892 | 393,288 | 406,772 | 248,797 | 131,709 | 138,119 | 162,011 | 98,764 | 51,063 | 19,548 | 6,403 | 1,904,671 |
| 1910-1911 | 78,678 | 196,597 | 538,630 | 416,374 | 208,490 | 127,015 | 115,654 | 105,385 | 74,361 | 48,107 | 23,036 | 5,556 | 1,937,883 |
| 1911-1912 | 75,922 | 199,039 | 320,569 | 314,330 | 301,257 | 176,639 | 171,219 | 138,045 | 102,727 | 52,757 | 22,664 | 5,335 | 1,880,503 |
| 1912-1913 | 41,335 | 171,798 | 636,626 | 464,450 | 223,096 | 201,154 | 193,846 | 217,240 | 191,250 | 93,969 | 45,177 | 16,706 | 2,496,647 |
| Yearly average for 10 years. | 94,053 | 223,780 | 427,858 | 373,551 | 210,877 | 157,362 | 134,506 | 148,385 | 101,236 | 54,835 | 23,125 | 9,317 | 1,958,884 |

* Boxes have been reduced to barrels, three boxes to a barrel.

A COMPARISON of prices of farm products as a whole for seventy-three years is given in bulletin 341 of this station. The prices of various products do not rise and fall together; at one time a certain product may rise more rapidly in price than other products, at another time it may not rise so fast. The prices of products are to some extent an indication as to which products are being over or under produced. The average prices in different months is one of the factors that help in determining the best time for selling. The cost of storage, the probable shrinkage in the particular storage, extra cost of handling, need for the money and other factors must also be considered. The changes in prices of different varieties may be of some value in determining what varieties should be planted. This article gives information as to the receipts of apples in New York City for different years and for different months, the average prices by years and a comparison of the rise in price with the changes in price of other products, the average prices by months, and the average prices of different varieties of apples. It is hoped that these figures may be of some help to farmers who are interested in apples.

The figures used in this article are those of the New York market. They were obtained in the following ways: The receipts of apples were obtained from the statistician of the New York Mercantile Exchange; the price figures, representing wholesale prices on the New York market, were obtained from weekly quotations in the Rural New-Yorker; missing figures were supplied from the Tribune Farmer, including the record for the season of 1903-1904. The quotations are made up by a gentleman whose business it is to cover the market and make a record of actual sales. Probably seventy-five per cent of the business done in apples is covered. The daily quotations are averaged in order to obtain weekly figures giving the high and the low range, and these figures are published. In this work, weekly quotations have been averaged in order to obtain figures representing the range in prices for the month. The average price for the month has then been computed and average figures have been used in all calculations.

The monthly and the yearly receipts of apples in New York for twenty years are given in Table I. The average receipts per year for the first ten years were 847,996 barrels. For the second ten-years period the receipts were 1,958,884 barrels. This is an increase of 131 per cent. During the ten years 1900 to 1910, the population of the area now making up New York City increased 39 per cent. The population of the New York metropolitan district, including New York and thirty cities and towns surrounding it, increased 46 per cent. We do not know whether or not New York is acting as a distributing center more than formerly, but there seems to be no doubt that the average person is using very

TABLE II—AVERAGE MONTHLY RECEIPTS OF APPLES IN NEW YORK

| Month | 1893 to 1903 Average Receipts | 1893 to 1903 Per cent of Total | 1903 to 1913 Average Receipts | 1903 to 1913 Per cent of Total |
|---|---|---|---|---|
| August | 33,370 | 3.94 | 94,053 | 4.80 |
| September | 85,950 | 10.14 | 223,780 | 11.42 |
| October | 176,115 | 20.77 | 427,858 | 21.84 |
| November | 171,491 | 20.22 | 373,551 | 19.07 |
| December | 96,964 | 11.43 | 210,877 | 10.77 |
| January | 69,385 | 8.18 | 157,362 | 8.03 |
| February | 63,659 | 7.51 | 134,506 | 6.87 |
| March | 65,632 | 7.74 | 148,358 | 7.57 |
| April | 45,314 | 5.34 | 101,236 | 5.17 |
| May | 21,968 | 2.59 | 54,835 | 2.80 |
| June | 6,814 | 0.80 | 23,125 | 1.18 |
| July | 11,337 | 1.34 | 9,317 | 0.48 |

TABLE III—AVERAGE PRICES PER BARREL OF APPLES IN NEW YORK BY MONTHS FOR TWENTY YEARS.*

| | August | September | October | November | December | January | February | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1893-1894 | $2.18 | $2.45 | $2.65 | $3.10 | $3.88 | $4.56 | $5.10 | $4.37 | $5.00 | $4.98 | .... |
| 1894-1895 | 1.83 | 1.95 | 2.17 | 2.34 | 2.58 | 3.00 | 3.84 | 3.69 | 4.00 | 3.52 | .... |
| 1895-1896 | 1.56 | 1.59 | 1.99 | 2.13 | 2.28 | 2.30 | 2.64 | 2.95 | 3.19 | 3.16 | $3.25 |
| 1896-1897 | 1.49 | 1.32 | 1.31 | 1.20 | 1.20 | 1.40 | 1.53 | 1.56 | 2.22 | 2.60 | 2.89 |
| 1897-1898 | 1.98 | 2.11 | 2.22 | 2.54 | 2.99 | 3.27 | 3.23 | 3.16 | 3.08 | 3.26 | 3.47 |
| 1898-1899 | 2.13 | 2.43 | 2.27 | 3.48 | 3.93 | 4.12 | 4.00 | 4.61 | 4.33 | 3.92 | 4.14 |
| 1899-1900 | 1.69 | 1.81 | 1.78 | 2.05 | 2.51 | 2.61 | 2.91 | 3.38 | 4.19 | 4.97 | 3.37 |
| 1900-1901 | 1.63 | 1.84 | 1.87 | 2.32 | 2.70 | 2.74 | 3.11 | 3.23 | 3.36 | 3.52 | 4.31 |
| 1901-1902 | 3.08 | 3.23 | 3.80 | 4.45 | 4.10 | 2.59 | 3.21 | 3.68 | 3.87 | 3.69 | 3.37 |
| 1902-1903 | 2.00 | 1.72 | 1.99 | 1.77 | 1.76 | 2.56 | 2.35 | 2.37 | 2.37 | 2.50 | 2.56 |
| 1903-1904 | 2.38 | 2.02 | 2.18 | 2.42 | 2.36 | 2.40 | 2.85 | 2.67 | 2.66 | 2.66 | 2.55 |
| 1904-1905 | 2.15 | 1.85 | 1.75 | 1.95 | 2.19 | 2.22 | 2.34 | 2.41 | 2.20 | 2.72 | 3.31 |
| 1905-1906 | 2.54 | 2.56 | 2.90 | 3.32 | 3.53 | 3.50 | 4.51 | 4.77 | 5.10 | 5.24 | 5.48 |
| 1906-1907 | 2.67 | 2.48 | 2.34 | 2.38 | 2.19 | 2.26 | 2.80 | 3.82 | 3.94 | 5.23 | 5.64 |
| 1907-1908 | .... | 2.91 | 2.94 | 3.06 | 2.95 | 3.08 | 3.71 | 3.04 | 3.33 | 3.05 | 1.93 |
| 1908-1909 | 2.93 | 2.59 | 2.75 | 3.00 | 3.58 | 4.11 | 4.33 | 4.25 | 4.29 | 4.60 | 4.93 |
| 1909-1910 | 3.15 | 3.31 | 3.04 | 3.27 | 3.20 | 3.00 | 3.23 | 3.10 | 3.14 | 3.58 | 3.88 |
| 1910-1911 | 3.17 | 3.27 | 3.28 | 3.40 | 3.37 | 3.77 | 4.19 | 4.48 | 4.85 | 4.81 | 4.33 |
| 1911-1912 | 2.34 | 2.22 | 2.51 | 2.63 | 2.59 | 2.87 | 2.66 | 3.03 | 3.44 | 3.66 | 3.11 |
| 1912-1913 | .... | 2.66 | 2.48 | 2.40 | 2.38 | 2.53 | 2.69 | 2.44 | 2.69 | 4.04 | 4.09 |
| Yearly average for twenty years | $2.27 | $2.32 | $2.41 | $2.66 | $2.81 | $2.94 | $3.26 | $3.35 | $3.56 | $3.74 | $3.70 |
| Yearly average 1893 to 1903 | 1.96 | 2.05 | 2.20 | 2.54 | 2.79 | 2.91 | 3.19 | 3.30 | 3.56 | 3.52 | 3.42 |
| Yearly average 1903 to 1913 | 2.67 | 2.59 | 2.62 | 2.78 | 2.83 | 2.97 | 3.33 | 3.40 | 3.56 | 3.96 | 3.92 |

* Sixteen varieties are considered in this table—all that were quoted consistently enough to be worthy of consideration. They are: Alexander, Fall Pippin, Fameuse, Gravenstein, Maiden Blush, McIntosh, Oldenburg, Twenty Ounce, Baldwin, Ben Davis, Esopus Spitzenberg, Northern Spy, Rhode Island, Russet, Tompkins King, Pound Sweet. In the statement of receipts the number of barrels of each variety is not given. Each variety has equal weight for the months for which it is quoted. This allows for some error, but is the most nearly accurate way of figuring.

TABLE IV—AVERAGE PRICES OF APPLES IN NEW YORK FOR TWENTY YEARS.*

| | Total Receipts (Barrels) | Total Value | Average Price Per Barrel | | | Total Receipts (Barrels) | Total Value | Average Price Per Barrel | |
|---|---|---|---|---|---|---|---|---|---|
| 1893-1894 | 234,863 | $ 805,873 | $3.43 | | 1903-1904 | 2,043,606 | $4,880,324 | $2.39 | |
| 1894-1895 | 526,338 | 1,368,716 | 2.60 | | 1904-1905 | 1,865,459 | 3,895,384 | 2.09 | |
| 1895-1896 | 736,187 | 1,627,907 | 2.21 | | 1905-1906 | 1,566,855 | 5,176,749 | 3.30 | |
| 1896-1897 | 1,426,546 | 2,018,411 | 1.41 | | 1906-1907 | 2,227,577 | 5,889,810 | 2.64 | |
| 1897-1898 | 877,077 | 2,336,934 | 2.66 | $2.62 | 1907-1908 | 1,687,719 | 5,150,687 | 3.05 | $2.87 |
| 1898-1899 | 650,686 | 2,116,021 | 3.25 | | 1908-1909 | 1,858,267 | 5,992,356 | 3.22 | |
| 1899-1900 | 921,648 | 2,147,728 | 2.33 | | 1909-1910 | 1,898,268 | 6,045,390 | 3.18 | |
| 1900-1901 | 895,967 | 2,238,004 | 2.50 | | 1910-1911 | 1,932,327 | 6,904,624 | 3.57 | |
| 1901-1902 | 553,816 | 2,057,679 | 3.72 | | 1911-1912 | 1,875,168 | 5,028,725 | 2.68 | |
| 1902-1903 | 1,540,005 | 3,196,294 | 2.08 | | 1912-1913 | 2,438,606 | 6,320,766 | 2.59 | |

*The total value for the year is obtained by multiplying the receipts for each month (Table I) by the average price for that month (Table III). The total value divided by the total receipts gives the average price. This is the most nearly accurate method of determining the price with the figures available. No price was obtained for July, therefore the receipts for July were omitted. This was necessary also for June 1893-1894, June 1894-1895, August 1907-1908, and August 1912-1913.

TABLE VI—PRICES OF DIFFERENT VARIETIES BY YEARS AND PERCENTAGE OF INCREASE IN THE LAST TEN YEARS OVER THE PREVIOUS TEN YEARS *

| | Alexander | Fall Pippin | Fameuse | Gravenstein | Maiden Blush | McIntosh | Oldenburg | Twenty Ounce | Baldwin | Ben Davis | Esopus Spitzenberg | Northern Spy | Rhode Island | Russet | Tompkins King | Pound Sweet |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1893-1894 | ... | 2.54 | 3.28 | 2.64 | 2.40 | ... | 2.62 | 2.81 | 3.90 | 3.05 | 5.04 | 3.80 | 3.39 | 4.44 | 4.02 | ... |
| 1894-1895 | 2.75 | 2.02 | 2.45 | 1.84 | 2.01 | ... | 1.84 | 2.12 | 2.78 | 4.00 | 3.96 | 2.86 | 3.01 | 3.07 | 2.56 | ... |
| 1895-1896 | 2.32 | 1.73 | 3.16 | 1.86 | 1.62 | ... | 1.66 | 1.71 | 2.37 | 2.76 | 1.80 | 2.26 | 2.47 | 2.73 | 2.33 | ... |
| 1896-1897 | 1.57 | 1.30 | 1.49 | 1.53 | 1.12 | ... | 1.43 | 1.33 | 1.53 | 2.71 | 1.82 | 1.93 | 1.69 | 2.08 | 1.47 | 1.18 |
| 1897-1898 | 2.25 | 1.97 | ... | 2.07 | 2.20 | ... | 2.24 | 1.96 | 2.72 | 3.13 | ... | 2.83 | 2.87 | 2.88 | 3.15 | ... |
| 1898-1899 | 2.47 | 2.31 | 3.67 | 2.09 | 2.56 | ... | 2.25 | ... | 3.72 | 4.12 | ... | 3.63 | 4.17 | 3.49 | 3.20 | ... |
| 1899-1900 | 2.03 | 1.53 | 2.35 | 2.02 | 1.69 | ... | 1.68 | 1.73 | 2.77 | 3.06 | 3.51 | 2.71 | 2.55 | 3.16 | 2.51 | ... |
| 1900-1901 | 1.92 | 1.63 | 2.47 | 2.00 | 1.73 | ... | 1.95 | 1.75 | 2.70 | 2.87 | 3.78 | 2.97 | 2.49 | 3.04 | 2.73 | 1.93 |
| 1901-1902 | 3.52 | 3.37 | 4.06 | 3.01 | ... | ... | 3.36 | 3.52 | 3.46 | 3.52 | 4.46 | 3.20 | 3.65 | 2.92 | 4.17 | 2.91 |
| 1902-1903 | 2.32 | 1.67 | 1.76 | 1.87 | 1.71 | ... | 2.85 | 1.80 | 1.99 | 2.24 | 2.73 | 2.07 | 2.14 | 2.17 | 2.24 | 1.50 |
| 1903-1904 | 2.93 | 1.93 | 2.77 | 2.52 | 1.96 | ... | 2.35 | 2.06 | 2.23 | 2.33 | 2.90 | 2.59 | 2.32 | 2.30 | 2.80 | 1.86 |
| 1904-1905 | 2.26 | 1.85 | 2.04 | 1.98 | 1.76 | 3.00 | 1.93 | 2.05 | 2.07 | 2.19 | 2.54 | 2.42 | 1.94 | 2.52 | 2.52 | 1.50 |
| 1905-1906 | 2.31 | 2.55 | 3.06 | 2.78 | 2.46 | 3.90 | 2.74 | 2.84 | 3.88 | 4.02 | 4.25 | 4.64 | 3.79 | 4.55 | 4.15 | 2.75 |
| 1906-1907 | 2.93 | 2.39 | 2.76 | 2.54 | 2.42 | 3.25 | 2.62 | 2.24 | 3.26 | 3.29 | 3.24 | 3.29 | 2.94 | 4.09 | 3.03 | ... |
| 1907-1908 | 3.87 | 2.70 | 3.00 | 2.73 | 2.88 | 3.65 | 3.76 | 2.99 | 2.86 | 2.62 | 3.30 | 3.10 | 3.14 | 1.98 | 3.24 | 2.62 |
| 1908-1909 | 3.10 | 2.73 | 2.96 | 2.80 | 2.57 | 3.75 | 2.65 | 2.74 | 4.16 | 3.26 | 4.14 | 4.36 | 3.61 | 3.52 | 3.71 | 2.12 |
| 1909-1910 | 4.04 | 3.31 | 3.71 | 2.75 | 2.62 | 3.95 | 3.16 | 3.13 | 3.19 | 3.06 | 2.89 | 3.17 | 3.44 | 2.71 | 3.43 | ... |
| 1910-1911 | 3.71 | 3.12 | 3.37 | 3.05 | 3.36 | 3.89 | 3.05 | 3.48 | 4.02 | 3.60 | ... | 4.42 | 4.26 | 3.76 | 3.54 | ... |
| 1911-1912 | 2.98 | 2.34 | ... | 2.32 | 2.06 | 3.00 | 2.45 | 2.57 | 2.61 | 2.41 | 3.14 | 3.25 | 2.86 | ... | 2.83 | ... |
| 1912-1913 | 3.01 | 2.59 | ... | 2.69 | 2.32 | 3.22 | 2.46 | 2.56 | 2.66 | 2.46 | 3.25 | 3.35 | 2.71 | 2.42 | 2.55 | 2.10 |
| Average for twenty years | 2.75 | 2.28 | 2.84 | 2.35 | 2.18 | ... | 2.45 | 2.39 | 2.94 | 3.04 | 3.34 | 3.14 | 2.97 | 3.04 | 3.01 | 2.05 |
| Average 1893 to 1903 | 2.35 | 2.01 | 2.74 | 2.09 | 1.89 | ... | 2.19 | 2.08 | 2.79 | 3.15 | 3.39 | 2.83 | 2.84 | 3.00 | 2.84 | 1.88 |
| Average 1903 to 1913 | 3.11 | 2.55 | 2.96 | 2.62 | 2.44 | 3.51 | 2.72 | 2.67 | 3.09 | 2.92 | 3.29 | 3.46 | 3.10 | 3.09 | 3.18 | 2.16 |
| Percentage increase in last 10 years over previous 10 yrs. | 32.3 | 26.9 | 8.0 | 25.4 | 29.1 | ... | 24.2 | 28.4 | 10.8 | 7.3 | 2.9 | 22.3 | 9.2 | 3.0 | 12.0 | 14.9 |

* Blanks indicate no quotations for that year.

TABLE VII—AVERAGE PRICES OF VARIETIES BY MONTHS.

| Variety | August | September | October | November | December | January | February | March | April | May | June |
|---|---|---|---|---|---|---|---|---|---|---|---|
| *1893-1894 to 1902-1903* | | | | | | | | | | | |
| Alexander | $2.13 | $2.39 | $2.77 | $2.75 | .... | .... | .... | .... | .... | .... | .... |
| Fall Pippin | 1.56 | 1.89 | 2.09 | 1.98 | .... | .... | .... | .... | .... | .... | .... |
| Fameuse | .... | .... | 2.47 | 2.92 | $3.47 | .... | .... | .... | .... | .... | .... |
| Gravenstein | 1.82 | 2.16 | 2.03 | .... | .... | .... | .... | .... | .... | .... | .... |
| Maiden Blush | 1.64 | 1.86 | 2.08 | .... | .... | .... | .... | .... | .... | .... | .... |
| McIntosh | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... | .... |
| Oldenburg | 1.99 | 2.01 | 1.62 | .... | .... | .... | .... | .... | .... | .... | .... |
| Twenty Ounce | 1.83 | 1.93 | 2.05 | 2.64 | .... | .... | .... | .... | .... | .... | .... |
| Baldwin | .... | 1.75 | 1.85 | 2.30 | 2.61 | $2.75 | $3.03 | $3.15 | $3.45 | $3.56 | $3.57 |
| Ben Davis | .... | .... | 2.41 | 2.46 | 2.65 | 2.67 | 2.88 | 3.27 | 3.53 | 3.56 | 3.42 |
| Esopus Spitz | .... | .... | 2.91 | 3.03 | 3.34 | 3.13 | 3.61 | 3.68 | 3.90 | 3.29 | .... |
| Northern Spy | .... | .... | 1.89 | 2.32 | 2.47 | 2.72 | 3.00 | 3.06 | 3.73 | 3.40 | 3.05 |
| Rhode Island | .... | 1.90 | 2.01 | 2.43 | 2.75 | 2.91 | 3,12 | 3.30 | 3.76 | 3.34 | .... |
| Russet | .... | .... | .... | .... | .... | .... | .... | 2.98 | 2.83 | 3.07 | 3.10 |
| Tompkins King | .... | 2.31 | 2.48 | 2.99 | 2.99 | 2.96 | 3.38 | 3.03 | 1.84 | .... | .... |
| Pound Sweet | .... | 2.75 | 2.00 | 1.50 | 1.25 | .... | .... | .... | .... | .... | .... |
| *1903-1904 to 1912-1913* | | | | | | | | | | | |
| Alexander | 3.08 | 3.18 | 3.18 | 3.30 | .... | .... | .... | .... | .... | .... | .... |
| Fall Pippin | 2.43 | 2.43 | 2.52 | 2.87 | .... | .... | .... | .... | .... | .... | .... |
| Fameuse | .... | .... | 2.82 | 3.01 | 2.56 | .... | .... | .... | .... | .... | .... |
| Gravenstein | 2.48 | 2.62 | 2.64 | .... | .... | .... | .... | .... | .... | .... | .... |
| Maiden Blush | 2.23 | 2.41 | 2.42 | .... | .... | .... | .... | .... | .... | .... | .... |
| McIntosh | .... | 2.93 | 3.58 | 3.64 | 3.70 | .... | .... | .... | .... | .... | .... |
| Oldenburg | 2.63 | 2.72 | 2.91 | .... | .... | .... | .... | .... | .... | .... | .... |
| Twenty Ounce | 2.46 | 2.57 | 2.66 | 2.96 | .... | .... | .... | .... | .... | .... | .... |
| Baldwin | .... | 2.08 | 2.16 | 2.39 | 2.54 | 2.80 | 3.19 | 3.40 | 3.64 | 4.07 | 4.03 |
| Ben Davis | .... | .... | 2.44 | 2.41 | 2.29 | 2.47 | 2.71 | 3,21 | 3.25 | 3.80 | 3.94 |
| Esopus Spitz | .... | .... | 2.44 | 2.79 | 2.87 | 2.97 | 3.57 | 3.57 | 3.52 | 4.02 | .... |
| Northern Spy | .... | .... | 2.17 | 2.69 | 2.77 | 2.87 | 3.44 | 3.60 | 3.85 | 4.33 | 4.51 |
| Rhode Island | .... | 2.09 | 2.31 | 2.69 | 2.96 | 3.09 | 3.24 | 3.47 | 3.90 | 4.08 | .... |
| Russet | .... | .... | .... | .... | .... | .... | .... | 2.79 | 2.79 | 3.29 | 3.44 |
| Tompkins King | .... | 2.61 | 2.79 | 2.99 | 3.13 | 3.27 | 3.58 | 3.44 | 3.30 | .... | .... |
| Pound Sweet | .... | 1.68 | 2.02 | 2.34 | 2.37 | .... | .... | .... | .... | .... | .... |

TABLE V — COMPARATIVE INCREASE IN PRICE OF APPLES AND OTHER CROPS *

Percentage increase in price for last ten years as compared with previous ten years.

| | | | |
|---|---|---|---|
| Apples | 9.5 | Oats | 37.7 |
| Cotton | 64.1 | Potatoes | 28.2 |
| Corn | 41.9 | Wheat | 36.5 |
| Hay | 33.4 | | |

* The prices of other crops are farm prices taken from the Yearbook of the United States Department of Agriculture.

many more apples than formerly. Apparently 59 per cent more apples for every person are being used.

The receipts are heaviest in October and November, over 40 per cent of the receipts for the entire year going on the market during those months (see Table II). There has been little change in the proportion of receipts for each month during the two ten-year periods. The average prices of apples by months are shown in Table III. There is a gradual rise in the price of apples from August until May, with a slight drop in June. During the last ten years the prices for August and September have been relatively better than formerly. The average price of apples for the ten years from 1893 to 1903 was $2.62; for the next ten years it was $2.87 (Table IV). The average price varied from $1.41 in 1896 to $3.72 in 1901. In eight of the twenty years the average price was above $3.00 a barrel. In the last ten years apples show an increase of 9½ per cent as compared with the previous ten years. In the same period the price of cotton increased 64 per cent, corn 42, hay 33, oats 38, potatoes 28 and wheat 37 per cent. (See Table V.)

The very great increase of 131 per cent in the receipts of apples is probably the cause of the relatively small increase in their price. The Ben Davis and the Esopus Spitzenberg have dropped in price, while other varieties, including some of the early varieties, have risen (see Table VI). The average prices for each variety by months are shown in Table VII.

### Udo, New Japanese Vegetable

The United States Department of Agriculture has recently issued a new bulletin, No. 84, entitled "Experiment With Udo, the New Japanese Vegetable." This vegetable has been grown very successfully in Maryland by David Fairchild and is now considered a very worthy vegetable for production in the United States. However, it must be remembered, on account of it being entirely new, naturally it has no commercial demand, but if the people who have vegetable gardens will begin to plant Udo it would quickly become known, as it is a very excellent vegetable. It has a very distinct flavor and people are beginning to like it just the same as they have learned to like celery, asparagus and egg plant. It is stated in the bulletin that Udo has been successfully served at large dinner parties in Washington and on private tables of those who have grown it and it has met with a very favorable reception.

### Crop Estimate to Be Made

The North Pacific Fruit Distributors aim to take three estimates this year in an effort to secure reliable and approximate and correct information as to the tonnage of the different varieties of fruit that will be produced in Oregon, Washington, Idaho and Montana. Every grower will be called on to make a detailed estimate. Later inspectors will visit every district and form an estimate, working on a basis of acreage and average of former years, taking into consideration actual existing conditions this year.

# BETTER FRUIT

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**The Present Condition of the Orchard** Industry.—The general condition of business universally at the present time is a difficult and complex proposition to comprehend. Business has always been subject to waves of prosperity and depression. Extreme cases are referred to as "booms" or "panics." Ever since 1907 business in general has not been extremely satisfactory. During the last two years business has been suffering from depression. For some unknown reason there is a lack of development, and wherever a lack of development occurs then business becomes depressed. Railroads are doing no extension work and very little improvement work. They are simply maintaining present conditions. Other industries are acting similarly. Whether this is the result of a previous inflation or a question of politics is a question that no one seems able to answer. In fact many causes are given by various individuals, all of which are theoretical, none can be proved. It would look as if the present condition might be due to a combination of causes. All of this is theoretical and speculative, but it is known that at the present business is below normal. A general retrenchment has been going on. By that is meant cancelling of obligations and curtailment of expenses. As this has been continuing for some time it is the general impression that business has probably reached rock bottom and there is every reason to hope that an improvement will soon follow. The financial condition of the country certainly seems solid. National banks in cities, which are required to carry a reserve of 15 per cent, have increased their reserve to 35 per cent. Country banks, which are required to carry 25 per cent reserve, have also gone up to 35 per cent, and some more. There is little demand for money at the bank. The banks have plenty of money to loan. This money is available for all business where the credit is absolutely first class, but all on short time, generally on demand. Bank money is not available at the present time for development work. Banks apparently do not care or intend, at the present time, to loan money on development work and the average going business is disinclined to borrow any more money than is absolutely necessary, therefore capital lacks its normal activity.

Much has been said about the high cost of living. Many articles of food cost the consumer much more now than they did a few years ago. The expense of doing business seems to have increased so that, although the consumer is paying much more, the producer, and frequently the manufacturer, is receiving considerably less, consequently it is evident that to meet the condition of the times the producer and the manufacturer must endeavor to reduce the cost of production and the cost of marketing. The consumer is at the present time paying too much, therefore the producer cannot expect to make more money by raising the price to the consumer, consquently he must reduce the cost of production and marketing. Fruitgrowers as a class, particularly in the Northwest in the past few years, have been receiving prices for apples enabling them to make good money, regardless of the cost of production. Inasmuch as the cost of marketing seems to have increased, the problem before the fruitgrower at the present time is to reduce the cost of marketing and the cost of production. Another problem before the fruitgrower is to raise the percentage of quality fruit and lower the percentage of cull fruit. That this can be done is a statement that cannot be denied. It is known that growers in some districts have produced 90 to 95 per cent of "extra fancy" and "fancy" grades combined, while others have gone below 50 per cent. What some growers can do others ought to and generally can do. Ordinary grades of fruit that are placed on the green fruit market do not bring back the cost of packing, freight and selling, and therefore pay the grower no profit. They are a strong factor in lowering the price of the better grades, consequently these lower grades should be eliminated from the green fruit market and converted into by-products. As there is no money in growing apples in the Northwest for the vinegar factory it is up to the grower to produce the greatest possible per cent of "extra fancy" and "fancy" grades. However, every grower cannot help but have a moderate per cent of the lower grade apples, which should go to the vinegar factory, and although they bring no profit, inasmuch as they are grown and have to be harvested whatever the receipts may be, it will mean just so much money saved for the fruitgrower. The vinegar factory, evaporator, cannery and by-product factory should be encouraged and assisted in every way possible. This will be a saving to the grower somewhere near the cost of production, but the increased price created by reducing the quantity by eliminating the low grades is far more important.

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**Apple Prospects in the Northwest.**—This year the bloom was one of the heaviest ever occurring in the Northwest. Estimates went soaring, but as soon as the blossoms had shed the fruit began to shed, and the shedding is reported serious in all districts. The Newtowns were white with bloom. Many clusters have shed completely and nearly all shed to one in a cluster. The shedding of Newtowns is heavy and the crop will be much lighter than originally estimated. Other varieties that bloomed very heavily have acted similarly. The varieties like Spitzenbergs, which did not bloom profusely, have generally set better than Newtowns. Arkansas Blacks have shed to one in a cluster, with many clusters gone. Winesaps are showing shedding. Some apples that are still sticking to the trees show indications of light yellow around the stem, indicating that further shedding will follow. At the present time no reliable estimates can be given because it is impossible to tell how much more shedding will occur, and for the further reason the apples at the present time are so small that it is next to impossible for the grower to estimate his crops on the trees.

---

**Standardized Boxes.—The Northwest** stood solid for what is known as the "Oregon box," 10½x11½x18 inches, inside measurements, without distension of parts, and the bill to standardize the apple box is now in Congress in the hands of the committee, with chances of its being acted on favorably. Whether this bill is passed by Congress this session or not the Northwest will practically accomplish a standardization of all apple boxes. Nothing else will be used in the Northwest except the 10½x11½x18 inches, known as the "Oregon box."

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**Grading of Apples.—Never before in** the history of the apple business have all the different apple districts, all the different shippers and individual shippers so universally adopted grading rules, which are practically the same. The result will be the crop of apples going from the Northwest this year will be packed in grades that will be uniform.

---

**Peaches seem to have suffered from** the frost and cold weather during the blossoming time and, generally speaking, the set is light. Considerable curl leaf exists in different districts, which will also reduce the crop.

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**Strawberries.—During the blossom**ing period slight frost injured but a small per cent of the strawberry crop. The harvest so far indicates that the yield of strawberries will be practically normal.

**Mr. H. F. Davidson,** whose picture appears on the cover page of this edition, was born at Lima, Ohio, in 1867, and is now 47 years of age. In the year 1890 he came to Hood River to engage in fruit growing and later became manager of the Hood River Fruitgrowers' Association, which was organized in 1893, being the oldest fruitgrowers' association in the Northwest. This position he held for three years, and in 1897 he organized the Davidson Fruit Co., a large private corporation for handling fruits. He built up a very successful business, with a large warehouse and cold storage plant along the track of the O.-W. R. & N. Co. In 1913 the North Pacific Fruit Distributors was organized and Mr. Davidson was elected president. The North Pacific Fruit Distributors is the largest handler of apples, pears, peaches and prunes of any concern in America. This same year the Apple Growers' Association was organized in Hood River, being a consolidation of the Hood River Apple Growers' Union, the Davidson Fruit Co., the National Apple Company and Hood River Land & Cold Storage Co. The Davidson Fruit Co. is the owner of several hundred acres of orchard land in Hood River. Mr. Davidson has always been a large grower as well as a heavy shipper for himself and other people engaged in the fruit industry. Having been engaged in growing and marketing fruit for twenty-four years, during which time he has visited nearly all of the important apple markets of the United States, it can be conservatively said that no man in the Northwest is better posted in a general way on the growing and marketing of fruits in the Northwest than Mr. Davidson. From many years of actual experience, Mr. Davidson knows just how to produce "quality" fruit, when each variety should be picked, the proper condition for cold storage and the proper time for consumption. He knows just when each variety of apple is best for consumption and is familiar with all markets and their requirements.

---

**Spraying.—The 1914 apple crop** will be clean. Never before in the history of the business have the Northwestern fruitgrowers done so thorough a job of spraying as they have this year. There is every reason to believe that the crop of apples of the Northwest will be cleaner this year than ever before.





**The Pollination of Apples.—The cold** rainy weather that prevailed during the blossoming time in many districts throughout the Northwest is probably the cause of the severe shedding that is occurring. However, in some localities the extremely low temperature prevailing during the blossoming time is undoubtedly responsible for some of the shedding.

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**The Pear Crop.—Frosty weather** prevailing in many districts where pears are grown extensively has very materially reduced the pear crop, so that at the present time growers are estimating that the pear crop will be not more than fifty per cent.

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**Cherries.—The crop of cherries was** seriously affected by the cold weather prevailing during blossoming time, which interefered with pollination. The cherry crop in some districts will not exceed twenty-five per cent of last year's crop.

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### Nurserymen's Annual Convention

The American Association of Nurserymen, which held its thirty-fifth annual convention in Portland in 1913, will hold their thirty-ninth annual convention at Cleveland, Ohio, June 24th-26th, inclusive, with headquarters at the Hollenden Hotel. Mr. J. W. Pilkington, one of the prominent nurserymen of Portland, is president; and, by the way, Mr. Pilkington was the first man ever elected from the West as president of the American Association of Nurserymen. Mr. John Hall of Rochester is secretary, and from him can be obtained full particulars of the meeting upon request. The secretary has already issued the prospectus sheet, including the program and much other information. The following is a partial list of the addresses to be given: John Dayton on "Competition"; J. R. Mayher, "Problems of Marketing Our Produce"; Jefferson Thomas, "Where Our Trees Are Going"; W. C. Reed, "Pecans for Profit"; C. S. Harrison, "Mission of Beauty"; John C. Cannon, Scotland, "Trade Conditions on the Other Side"; Robert Pyles, "Roses"; Henry Hicks, "Fitting Trees to Soil and Climate." George C. Roeding of Fresno, California, who is one of the best known nurserymen of the Pacific Coast, will also deliver an address, although his subject has not yet been given. This convention will be extremely interesting and valuable and one which every nurseryman should attend.

# A National Marketing Campaign

By Charles W. Holman, Secretary National Association of Farm Credits

A PERMANENT organization to forward the national movement for the improvement of standards of paeks, paekages and earriers in connection with the marketing of farm produets and for the eneouragement of farmers' marketing organizations on the nonprofit eorporation plan, with the possible holding of an all-American exhibit of packs and packages, were among the big results of the Second National Conferenee on Marketing and Farm Credits held in Chieago, April 14-17. At a business session the delegates passed by unanimous vote the following report of the eommittee on permanent organization:

"After a survey of the problems, both loeal and national, your eommittee reeommends: (1) That the work of this body should be perpetuated under the name of the National Conferenee on Marketing and Farm Credits. (2) That the chairman of the business sessions be instructed to appoint a general committee of not less than fifteen members, whose personnel shall be of a representative charaeter.

"This eommittee should have powers: (1) To increase its membership according to the needs of the work to be done. (2) To create sueh sub-committees to represent the various interests that from time to time will ally themselves with the National Conference on Marketing and Farm Credits. (3) To work out a seheme of membership representation among the various societies, organizations, institutions and individuals that are admitted to membership, and a suitable membership fee for each of the parties here referred to. (4) To begin a eonstructive educational program for the improvement of the standards of farm produets and for the assisting of farm producers to perfect the neeessary organizations for the earrying out of this plan in the most businesslike way that is possible for eaeh organization. (5) To look into the feasibility of holding an all-Ameriean standardization exhibit at the time of the third conference and to be given power to act. (6) To determine the time and plaee of the Third National Conference on Marketing and Farm Credits.

"The authority granted this general committee and its sub-eommittees should expire at the end of the Third National Conference on Marketing and Farm Credits. Respectfully submitted, Frank L. McVey, B. F. Harris, Charles McCarthy, John Graham Brooks, Lou D. Sweet, J. C. Caldwell, Charles W. Holman."

With President F. L. McVey of the University of North Dakota rests the responsibility of selecting this committee that will have the future of this great movement in its hands. President McVey will make the appointments within a few weeks.

In addition the delegates passed, with only two dissenting votes, the following report of the committee on resolutions: "Your committee on resolutions respectfully submits the following: (1) Whereas, the Sherman act as it is now construed is a serious menaee to progress of organization and confederation; and whereas, the farmers and the other co-operative organizations do not wish to be lawbreakers, neither do they wish for special exemptions of any kind; and whereas, they wish legislation which will not hinder or forbid sueh legitimate organization and which will prevent unfair practices by all organizations as well as protect such organizations from unfair diserimination and practices directed by great or small combinations of dealers; therefore be it resolved, that this eonferenee demands from Congress legislation which will properly modify the existing Sherman law to the end that this proper and reasonable protection and regulation be extended to co-operative organizations, whether they be of eonsumers or producers, and to the end that such organization be fully proteeted and eneouraged thereby. (2) Resolved, that it is the judgment of the conference that Congress should appropriate liberally for the maintenance of the offiee of markets, and further, that the said offiee of markets should employ, at the earliest possible time, speeialists eharged with the duty of ascertaining all facts pertaining to the marketing of all farm products, particularly perishable products, having in mind an early plan for the proper preparation for market, shipping, inspection and selling of the said products, and that as early as practicable special attention be given to the investigation of the feasibility of plaeing federal inspectors of perishable produets in prineipal market and transportation centers; also that this offiee be urged to eo-operate with the various state departments of agriculture. (3) Resolved, that we urge all farmers and other co-operative organizations to join us by sending delegates on a proper representation basis as determined by our permanent committee to our next conference in order that all co-operators

will eventually be joined in some kind of a national permanent federation. (4) Resolved, that this conference hereby requests all transportation bodies to extend the work now done for greater production to an equal effort toward standardization and marketing, and that these transportation agencies be invited to co-operate with all future efforts of this conference in this direction; we hereby urge such agencies to federate their efforts and organize definitely for this purpose. (5) Resolved, that the question of holding the conference at the San Francisco Exposition be referred to the committee on permanent organization which has already been charged with the duty of passing upon the time and place of the next meeting.

"(6) Whereas, the National Commission on Industrial Relations has indicated the intention of looking into the farm labor problem, therefore be it resolved that this conference urge that the said commission make an exhaustive investigation of both the farm labor and farm tenancy problems, particularly in their relation to the more businesslike production and distribution of farm products. (7) Whereas, the educational institutions of the various states of the United States have during the past decades given most of their attention to the problems of production insofar as they have interested themselves in agriculture; and whereas, the problems of marketing and farm credits have now come forward as questions of great national importance, causing great public concern; therefore be it resolved, that the Second National Conference on Marketing and Farm Credits urges upon the aforesaid educational institutions the desirability of giving these subjects a place in their courses of study; and be it further resolved that we urge legislative bodies to liberally support the effort to establish this new work by reasonable appropriations of the public funds. (8) Be it resolved, and it is the sense of this body, that the campaign for the standardization of packs, packages, carriers, etc., should be immediately taken up and the various interests employed in promoting this work be solicited to co-operate in forwarding this work and in forwarding an all-American standardization exhibit. (9) Resolved, that this conference urge upon Congress action upon the question of rural credit; this action should be taken, however, with care and deliberation. Great interests which have already controlled the marketing of industrial securities are now striving to gain control over rural credit. Again we recognize that any system of bonding on a long-time basis must be based on the soundest valuation and maintenance of agricultural values. Any hasty or wildcat exploitation will only hurt in the end every effort to promote an efficient system of agricultural credit. Amortization schemes must be carefully tested in order that they do not prove a snare and delusion. Reckless governmental aid plans are detrimental to true co-





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operation, which is only sueeessful the world over when based upon self-help, eareful auditing, valuation and sound business methods; we favor the basie co-operative prineiples in dealing with the question of farm credit as well as in all other matters of farm organization. (10) Resolved, that we heartily endorse the passage by several Legislatures of true eo-operative laws based upon the one-man, one-vote basis, and urge upon members of this eonferenee the neeessity for promoting such laws in every state of the Union. We hereby endorse the eo-operative plan of marketing goods and urge upon our Legislatures proper legislation for the eneouragement of sueh organizations, the proteetion of them against unfair diserimination and upon the business of producers, and also such survey of state markets and market conditions, and the furnishing of sueh information, by marketing commission or otherwise, as will adequately help in the work of such true eo-operative organizations.

"Whereas, the national government and the various state governments now expend large sums for the collection and diffusion of information showing the quantities of farm products raised by Ameriean farmers, i. e., to the question of supply, but have given little attention to the question of location and extent of demand; therefore be it resolved, that the eonference urges the desirability of the collection and diffusion of similar information showing the demand for these produets both in this eountry and abroad. J. C. Caldwell, Charles McCarthy, John Lee Coulter, John Graham Brooks, A. W. Sanborn."

The eommittee on credentials reported delegates from Canada, California, Colorado, District of Columbia, Florida, Illinois, Indiana, Iowa, Kansas, Massachusetts, Miehigan, Minnesota, Missouri, Nebraska, North Dakota, New Jersey, New York, Ohio, Oklahoma, Pennsylvania, Rhode Island, Tennessee, Texas, Virginia, West Virginia, Washington, Oregon and Wiseonsin.

An analysis of the personnel of the delegates showed representatives from 46 farm journals and newspapers, 26 farmers' organizations, 26 colleges, universities and experiment stations, 23 railroads, 12 banks and bankers' organizations, 11 labor organizations and 10 consumers' co-operative organizations. In addition to these there were 40 farmers, 8 representatives of express companies, 8 grain men, 7 lawyers, 6 real estate men, 5 retail merehants, 3 wholesale produee dealers and over a hundred unclassified, including students, housewives, agents of manufaeturers, ete. The total of delegates seated was over 350.

### Panama-Pacific Booklet

The Panama-Paeifie International Exposition is attraeting an immense amount of attention and probably will have more visitors than almost any other exposition that has ever been




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held. In another part of this publication is given a condensed report of some of the main features, which every fruit grower should read. However, there is nothing in the way of reading matter that conveys quite the impression as a picture or illustration. We have just received a very handsome illustrated booklet, printed on calendared paper, beautifully illustrated in colors, showing the general plan of the grounds of the exposition, a view of the city, a map of the world, a map of the State of California, a map of the Panama Canal, and some of the wonderful scenery that can be visited lving along the different transcontinental railroads. This booklet is issued by the Remington Typewriter Company. It is being distributed free and can be obtained on request from any of their offices.

## Attractiveness of the Country Home

Here are some sentiments taken from recent publications which express the lure of the country for the boy or girl who is so fortunate as to live within reach of country sights and sounds:

"A child whose early years are spent largely in the country will fondly remember his youth and his beloved animal companions, for country life for a child is rich with happy associations, while the youth of a child kept constantly in the city is a starved sort of thing."

"When we say widen the outlook for the boys and girls, we do not mean that they must go away from home to find the world. If you will just show them that the world is right under their feet and over their heads, and that they have all the science right at hand, and all the arts for that matter, they will not wander from home. Still it is necessary to furnish them intellectual tools and stimulus in the way of books and magazines. Unfortunately, most of our country homes have only those papers that give a questionable lot of passing information."

"A country cannot hope for agricultural prosperity unless the face of the youth of the land is turned toward her fields and meadows, and the boy of this country, alert, eager, questioning, will face the direction of most vital interest—the city, if it offers the greater thrill and opportunity—or the country, if it beckens with big enough call to the pulse of the youth. But the appeal has got to be genuine; it has got to flaunt a banner and stir the blood, and promise some sort of a tangible victory."

Now is the time to consider the plans for making the surroundings of the country home attractive, that environment may exert its strong influence in the right direction. The tin cans and other unsightly accumulations of rubbish should not be a part of the memory of home which any child carries into adult life. A few seeds of vines planted where needed will make a thing of beauty of some ugly object which cannot well be removed, and "A thing of beauty is a joy forever."

This is a practical phase of home life which should not be crowded aside for what may seem to be more immediately remunerative interests. Make home surroundings attractive and beautiful and so increase the hold of the country home on the young folks.—Virginia H. Corbett, Colorado Experiment Station, Fort Collins, Colorado.



### Dormant Sprays for Orchard Trees

Professor C. P. Gillette of Ft. Collins, Colorado, in speaking of dormant sprays for orchard trees, says it is difficult to recommend the best sprays without knowing the particular insects or diseases that are to be treated. However strange it may seem, it is a fact nevertheless that many fruitgrowers spray without spraying for some particular reason, but simply because their neighbor is spraying with something for something for which the grower may have or may not have. The fruitgrower should never spray without spraying for some particular purpose, some pest or some disease, and he should know the remedy he applies is the best that can be used for the purpose. Professor Gillette recommends lime and sulphur as a dormant spray especially good for the destruction of brown mites, red spiders, San Jose scale and other scale. Professor Gillette also states that lime and sulphur is not of much value in controlling plant lice and of no service in controlling codling moth. While all fruitgrowers probably know that lime and sulphur is of no value in controlling codling moth, there are some who are inclined to believe it will kill plant lice. Professor Gillette has carried on a very extensive work in reference to controlling of plant lice, therefore his opinion should be of great value.

### Spraying Season

Whenever anyone takes a trip through any of the fruit-growing sections it is a common sight to see practically every man who is handling the spray rod thoroughly sprayed, in fact usually well drenched. There are some painters who get as much paint on their clothes, face and hands as they do on the building which they are painting. There are many men handling the spray rods who get more spray on their clothes, face and hands than they do on the tree. A certain amount of this, particularly in windy sections, is unavoidable; however, the careful man can spray a tree thoroughly and still keep his clothes and himself moderately free from the spray. As many commercial sprays are caustic or burning, it is a good plan before beginning to spray in the morning to grease your face and hands thoroughly with vaseline, which will prevent the spray from burning the face and can be easily removed in washing at the end of the day's work.

# The Thinning of Apples

By Jay L. Reynolds, Horticulturist, Spokane, Washington

IT is not the question of how many apples you can make your trees produce, it is the question of "quality." Therefore the high endeavor of the apple grower should be to elevate the quality. "Extra fancy" and "fancy" apples are the only grades there is any money in, and it should be an axiom among apple growers that you cannot raise the maximum of high-grade apples if you permit your trees to be burdened with "C" grade and cull apples. There is no other one thing an orchardist can do which will give a larger measure of paying results than will the proper thinning of apples. There is undoubtedly no other one thing an orchardist has to do, or ought to do, which requires more courage in the doing and more thorough knowledge of the "why" of it than does this work if properly done. I never yet have seen the man who could, or would anyway, thin his own apples as it should be done, and some will not permit it to be done, although they lose by it. They are not altogether to be blamed for it either, for to see a tree well loaded with fruit is certainly pleasing to the eye, and to pull this fruit off and throw it away looks, on the face of it, like sheer destruction—like taking money out of your pocket and burning it. But such is not the case.

As a general rule apple trees will form and mature from two to four times as many apples as they should be permitted to, and with such a crop, if not interfered with, there will only be a small percentage of fancy apples, the balance a few "C" grades and all the rest will be culls because of size and other causes. This is inevitable, I care not what your soil or climatic conditions are. There are too many people raising "C" grade and cull apples, and there is no money in them. I have been laughed at because I have said "the best way to dispose of "C" grade and cull apples is not to raise them," and I still stand by that statement and insist that if a man is so timid, negilgent, careless or shiftless about thinning his apples and otherwise properly caring for his orchard so as to raise the largest possible measure of good marketable fruit he better quit the business, because his crop need not be "C" grades and culls unless he permits it. I say this not for offense, but in a spirit of just criticism for the good of the cause. I think you will readily agree with me in this, that there is more money, any year, in a small crop of fancy apples than there is in a large crop of culls.

Commence the thinning as soon as the apples are large enough so that you can readily see them. The earlier the better for the apples that are left on the tree. This will be about the latter part of June. The more thorough your work is at this time the less you will have to do later. It costs money, time and effort to do proper thinning, but it will pay to go over the orchard at least three times. The second time about the first to the middle of August and the third three weeks to a month before the apples mature. Have a good pair of thinning shears with which to cut off the apples and leaves. Don't try to pull the apples off with your fingers; first, because you are liable to pull off other apples which ought to be left on, and, second, when you pull an apple off you are liable to, and generally do, injure the fruit spur from which you remove it. Therefore, by all means use thinning shears. They only cost thirty-five to fifty cents and they are worth their weight in gold when it comes to the work at hand. You cannot only do the work better and safer with them but much more rapidly.

Rules for Removing Apples.—(1) Remove all apples from the ends or extremities of limbs. They will never be large. They are too far from the food supply. (2) In clusters, save the largest, most perfect one, which is usually in the center, and remove all the rest. (3) Remove all misshapen, scabby, scarred and wormy apples. (4) Never permit two apples to grow closer together than the width of your hand. (5) Remove all apples that hang in such a manner that they rub against a limb. They will be scarred if not misshapen. (6) Leave only perfect apples on the tree. (7) Remove all leaves that lie upon or hang immediately over the fruit. They will shade the apples and prevent their coloring. (8) Never permit a wormy apple to remain in the top of the tree if you know it, notwithstanding the fact it is hard to get at. (9) Destroy all wormy apples, either by feeding them to stock or by burning them.

I have thinned apples off trees until I actually felt guilty and ashamed of myself, yet when they matured there were really more apples left on the tree than should have been. A good way to get an idea of about how a tree should look when properly thinned is to take an average tree and estimate, as near as you can, about how many boxes of apples it ought to carry. Multiply this by 100, the average number of apples in a box. This will give you the number of apples there ought to be on the tree. Now count them. It won't take long, taking each branch by itself. Then you will know about what you are doing, and that is always worth while.

After the August thinning I would recommend that you spray the orchard well with Black Leaf-40. This will serve a double purpose at this time. It will not only kill what aphis you might have on your trees but the offensive fumes of the tobacco will also have a tendency to keep away insects which might otherwise sting and injure the fruit.

The economic value of the thinning of apples is obvious to any man who makes big money out of the growing of that fruit, because he knows that it is not only this year's crop that is being benefited but future crops as well. For, if the trees are permitted to carry all the apples they will, they are bound to deplete their vitality, and the consequences are an off year. He knows, or should know at least, that it is the seed rather than the pulp or pericarp of the apple that takes the vitality of the tree, and that by judicious thinning he saves just that much vitality for the fruit remaining on the tree and for future crops. Again, then, if by proper, systematic thinning you are more apt to get a good crop every year, is it not then the better part of wisdom to thin? Therefore thin your apples properly, according to the rules suggested. It is one of the big secrets in apple culture. Raise a good crop of extra fancy fruit and raise a crop every year.

# Blight Fighting Without Funds

By O. I. Clamson, North Yakima, Washington

IN the attempt of the last Washington Legislature to establish the State Department of Agriculture, it succeeded only in destroying the old plan and leaving the new one stranded without funds to enforce what semblance of horticultural law still remained. As a result of such action the state is not only unable to come to the rescue of an endangered district, but the old power of the county commissioners to levy a tax to raise funds for the protection of the fruit industry was taken from them and the paying of such moneys made illegal. The result is that the fruitgrowers are stranded in the midst of a blight epidemic without laws sufficiently strong to control such a situation and without funds for the enforcement of what laws still exist. Fire-blight control cannot be accomplished by individual effort, and during the past two years of official inspection the blight has made such headway as to convince everyone of the futility of such a course unless backed by the most stringent of laws and a fund of money that would add immensely to the property holder's already heavy load. In the withdrawal of all official inspectors other than the district man came the climax of the old system. Such may have been a blessing in disguise, for it demanded some other method of handling the situation and resulted in the plan which has been adopted in Yakima County.

The very nature of the disease—its method of holding over from one season to another, its distribution and inoculation in the spring, all unite to make it a community problem and one which can be handled only by a united community action. With the elimination of all winter hold-overs in any considerable or isolated territory would come the eradication of fire blight from those orchards. This would require merely the very careful cutting of blight from all orchards before blossoming time in the spring. At a glance such appears simple enough, but in a county with 55,000 acres of fruit divided into an average of ten to twenty acres to each grower, there is a very small possibility that all these growers fully realize the danger of the fire-blight menace and properly handle the




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situation. In recognition of this fact the inspection department has proposed a system of voluntary blight-fighting organizations whereby each community assumes the responsibility for its own blight, and this responsibility is so distributed as to be best carried. Already twenty such organizations have been formed and are working for the eradication of this pest. Public sentiment and the united action of the growers of the community are the life of such a plan. Without this support the system is useless; but so far the ranchers have given it hearty support, and with the influence of the fifteen hundred growers who have already pledged themselves to unite in this anti-blight campaign we feel that the movement has made such headway as to secure a large measure of success.

In the meeting of the presidents and secretaries of existing Fruit Protective Associations which was held at North Yakima on February 2nd, 1914, an impetus was given the plan by perfecting a central organization of representatives from each community association. This gives a court of appeals for the locals, a central organization to back up and encourage their action. By the end of February it is expected that any action of this County Association, whose membership consists of representative growers from every corner of the county, will be backed by the signature and hearty co-operation of three thousand fruitgrowers in Yakima County. This greater organization is not to stop with the county, for already several other counties have applied for the privilege of joining the movement, and the association will probably be made state wide. In short, this means the perfecting of a great co-operative blight-fighting movement which, if properly conducted, should eradicate the disease from our orchards.

No law, however strong and definite it may be, is a success without sufficient public sentiment backing it up. The weight of public sentiment and neighborhood approval or disapproval has a much more effective bearing than any other agency. Add to this neighborhood approval or disapproval that of three thousand determined growers of the county, representing orchards of 55,000 acres in trees, and determine what that public sentiment should be able to accomplish in the way of protecting the orchards against fire-blight ravages. In each community, which in most cases has been the school district, meetings were called of all the resident growers and notices sent to non-resident owners. All the communities thus far organized have adopted uniform constitutions, elected their own officers, arranged their own boundaries and prepared a systematic campaign against fire blight. Each member of the executive board is a resident of the subdivision which he represents and in turn appoints as many members of his community as he deems necessary to serve on his sub-committee. In these subdivisions different plans are followed in different communities, but the essential

part is that a certain time is set as the latest date at which any orchard may be properly pruned for blight and ready for inspection by the committee. After a man has gone over his orchard carefully and cut out all the blight he can find he agrees to notify the chairman of his subdivision. It is then the chairman's duty to have his committee inspect carefully all the trees on the plot and tag such trees for quarantine upon which any blight is found. If none is located immediate permission is given to apply the winter spray, which has been withheld on account of the discoloring effect of the lime-sulphur and crude-oil emulsion upon the bark of the trees, thus preventing the proper location of blight cankers.

The following is a form of constitution adopted by the different organizations. This particular one being that of the Grandview Orchard Tracts:

"Constitution and By-Laws. — The name of this organization shall be the Grandview Orchard Tracts Fruit Protective and Improvement Association. This district shall be divided into five divisions, known as Nos. 99, 100, 101, 102 and 103. Boundaries of District.—North, O.-W. R. R. & N.; south, Mulberry Lane; east, Fisher Road; west, Belma Road. Boundaries of Divisions.—Division 99, Dana Smith, chairman. North, O.-W. R. R. & N.; south, Walnut Lane; east, Fisher Road; west, Apple Way. Division 100, S. R. Roney, chairman and president of district. North, Walnut Lane; south, Cherry Lane; east, Fisher Road; west, Apple Way. Division 101, J. H. Stuckrath, chairman and secretary of district. North, Cherry Lane; south, Mulberry Lane; east, Fisher Road; west, Apple Way. Division 102, J. W. Moore, chairman. North, O.-W. R. R. & N.; south, Walnut Drive; east, Apple Way; west, Belma Road. Division 103, A. L. Irish, chairman. North, Walnut Drive; south, Mulberry Lane; east, Apple Way; west, Belma Road.

"The object of this organization shall be to assist in the complete eradication of fire blight and other orchard pests and diseases from this district and to foster a spirit of closer co-operation between the fruitgrowers and the horticultural department of this county. Every person, firm or corporation owning, renting or leasing property within this district is eligible to become a member of this association by signing the constitution and by-laws. There are no fees or dues connected with this association. The officers of this association shall consist of a president and secretary, who shall serve one year or until their successors are elected. The president shall perform such duties as usually pertain to the office of president. He shall have the power to fill such vacancies as may occur in any office or committee whenever he deems advisable, or upon the request of five members shall call a special meeting. The secretary shall perform such duties as usually pertain to the office of secretary. The executive board shall consist of five members—the president, secre-

tary and three other members elected at a regular meeting. Each committeeman shall act as the chairman of a subcommittee, consisting of one or more members chosen by him from his division, to assist him in the inspection of orchards and supervision of blight conditions in his territory or division. It is the duty of each member of the executive board to inspect or have carefully inspected within his division, on or before March 1, 1914, all the apple, pear, quince and mountain-ash trees. Each member of the board shall submit a detailed written report to the executive board as a body describing conditions in his division. The board shall act on such reports and shall take such action as they deem necessary for the welfare of the community, and if any person, firm or corporation refuses to comply with the requests of the executive board they shall notify the district horticultural inspector, whose duty it shall be to take such action as he may deem necessary to abate such nuisance. The executive board shall meet once a month at such place and time as may be named by the president, or upon the request of two members of the executive board or association shall call a special meeting. The duties of the executive board shall be to investigate all complaints regarding fire blight and other orchard pests and diseases, also visit the person, firm or corporation's place against whom the complaints have been made. The executive board shall have the power to annex any adjoining territory which is not included in some other organization. A quorum shall consist of seven members. The constitution and by-laws of this association may be altered or amended by a majority of the members present at any regular meeting.

"Pledge.—We, the undersigned members of the Grandview Orchard Tracts Fruit Protective and Improvement Association, realizing that an emergency exists at the present time for immediate action in eradicating fire blight in our district, do hereby agree to cut the blight out of our orchards to the best of our ability, and will report to the executive board any person who is negligent in combating this disease and will co-operate with the executive board and render them any assistance that may be in our power to give. We also further agree not to spray our trees until inspected and passed by the chairman of our division.

"A copy of the constitution and by-laws is made in the horticultural office and furnished each chairman of a subcommittee, whose duty it is to secure the signature of all persons living







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within the territory under his charge."

Every man in a community should be helped by this system—the conscientious grower by the systematic inspection established, whereby not one pair of eyes but several are responsible for the location of blight hold-overs in the orchard; the careless or negligent grower by the pressure of public sentiment which is brought to bear upon him through such an organization. Each and every man feels like attacking his own blight with greater vim if he has assurance that all the others of his community and of adjoining communities are caring for theirs. According to the state law the district horticultural inspector has the power to disinfect any diseased tree, but there is no provision for funds to carry out such disinfection. In the case of these organizations, if some individual for one reason or another fails to properly cut the blight in his orchard, members of the community will be deputized to go in and disinfect the place as a matter of self-protection. Even though there is no way by which they can receive direct cash pay for the service it is believed that the ultimate saving to the community will more than repay them for their time and efforts. By thus effecting in every community of Yakima County a thorough blight-fighting organization, it is expected that the ranchers will save themselves thousands of dollars which would otherwise be expended or lost as a result of the fire-blight ravages, and this at a minimum expenditure of time and money.

## The Panama Pacific International Exposition

To give a description of this exposition, its buildings and its features would fill a book. Our space will not permit any descriptions in a detailed way, but it seems well to call attention to a few of the prominent facts in brief sentences. Thirty-five nations have accepted the invitation of the United States to participate. The Machinery Building covers nine acres. 220 conventions, with 500,000 delegates, are credited already to meet in San Francisco during the exposition. 21 of these are agricultural societies, 20 business, 22 educational, 35 fraternal, 7 genealogical, 23 Greek letter fraternities, 15 governmental and civic societies, 5 historical and literary, 15 industrial, 9 labor, 13 professional, 8 religious, 19 sicentific and 7 social service. The livestock exhibit grounds will cover 65 acres. $300,000 have been assured as prizes for "An around-the-world race by motor-driven air craft." Over 50,000 troops, representing all the great nations of the world, will participate. An international fleet of over 200 vessels, including all types of battleships and warships, will assemble at Hampton Roads, proceeding through the Panama Canal to the exposition. The

art and loan exhibits will include masterpieees from all over the world. The international sports event and Olympie games will be prominent features. The grounds, eovering 635 acres, will be illuminated by the "Flood Lighting System," used for the first time. Only plants in full bloom will be allowed to remain on the grounds, eonsequently the grounds will be a continual blooming ground from start to finish. The Tower of Jewels will be a dominating arehitectural feature, with jewels hung in sueh a way that they will tremble and sparkle from natural vibration. Over $50,000,000 will be expended in the construction of the Panama Pacific Exposition. The woman's board of the Panama Paeifie Exposition will offer aid and assistanee in every way to women visitors. 6,000 nurses from all nations will meet in San Franeisco in eonvention. The Palaee of Edueation will eontain the largest and most exhaustive ehild-welfare exhibit ever assembled. Two acres will be devoted to the tulip exhibit. The mile raee track will be one of the finest in the world. $227,000 will be offered in prizes and awards. The Yellowstone National Park aeeurately reprodueed in the amusement eoneession. All proeesses in the silk industry will be shown, from the eulture of the butterflies and the unwinding of the eoeoons to the creation of the most elaborate toilettes. The Iee Hippodrome will contain a skating rink of three-quarters of an acre. The Santa Fe Railway Company will create a reproduetion of the famous Grand Canyon of Colorado. The exposition will spend $1,065,000 on the auditorium. The main hall will seat 10,000 people and the lesser halls from 600 to 1,000. Thirty-eight states have signified their intention of partieipating. The appropriations from these different states range from $35,000 by North Dakota to $700,000 by the State of New York. Every state and territory in the Union will be represented in some way in the exhibit

palaces. The twelve main exposition palaces are: The Palace of Machinery, The Palace of Education, The Palace of Food Products, The Palace of Agriculture, The Palace of Mines and Metallurgy, The Palace of Varied Industries, The Palace of Liberal Arts, The Palace of Manufactures, The Palace of Transportation, The Palace of Horticulture, The Palace of Fine Arts and Festival Hall.

## Fruitgrowers' Club

The present era is an age of rapid and intelligent development. Everywhere there is a trend for better business, better politics and improved sanitary conditions. Agricultural colleges and railroads are assisting the farmers by educating them in the methods of farming to enable them to produce larger crops of better quality. Fruitgrowers are quick to realize the benefits of improved conditions. In Hood River Valley there are several clubs composed of fruitgrowers which hold meetings for the purpose of discussing all subjects of interest. One club is called the "Research Club." At the meetings of the Research Club politics, local conditions and all kinds of improvement work are discussed intelligently by the members, already resulting in much good. At one of the clubs in Hood River Valley some of the members read articles that appear in fruitgrowers' papers, after which the article is discussed by the members. One fruit grower of Hood River informed the writer this week that it is customary to read articles from "Better Fruit" at their meetings. This certainly is a step in the right direction. While every reader of "Better Fruit" certainly receives great benefit from the different articles, the discussion brings out much that cannot be included in an article where the space is necessarily limited. There is a movement on foot to place horticultural and farm papers in the public schools. In fact, "Better Fruit" has received many such requests from high class private schools, as well as agricultural colleges, indicating generally the policy of the public is to introduce agriculture and horticulture in the school work. According to a report received from the Oregon Agricultural College at Corvallis, farm papers furnish the most general and perhaps the best written agricultural information available anywhere. Professor Reed, Agricultural College editor, states that patrons of the school should encourage schools in taking farm papers and suggests that teachers should keep clippings of the best articles, filing them away so they can be referred to each year in advance of the season when that particular article is applicable. The Kansas editor calls attention to the illustrations and drawings appearing in various rural publications, stating they are a great help to the students in their work, and particularly the illustrations which show the methods of doing some particular thing. It is stated by agricultural colleges that farm papers are extremely valuable for the reason that

they furnish agricultural matter in a form that is interesting and workable. It is certainly gratifying indeed to see professors showing their appreciation of good rural publications.

The editor of a fruit growers' paper or horticultural paper should be in general touch with all lines of development work in the particular class to which the publication is devoted. The editor of a fruit growers' paper should understand fruit growing and keep in continual touch with the situation. In fact, the editor of "Better Fruit" has always maintained that a man who is actually engaged in fruit growing, living in a fruit-growing section, is the editor who can furnish the most valuable and practical information on the fruit industry. In fact, the only man who can edit a fruit growers' paper intelligently and reliably is the man who actually knows the fruit business. Having worked at it some time in the past is not sufficient. He should be engaged in it at the present time and should be constantly in touch with every feature of the fruit industry, in order to give his readers reliable information and the latest and best methods of cultivation, pruning, spraying, controlling or eradicating any of the diseases or pests with which the fruit grower has to contend. Only a man who is actually engaged in the business is sufficiently informed to intelligently edit a fruit growers' paper in a practical and reliable way.

### Shade Trees for the Farm

Shade trees about a farm home add much to the beauty, comfort and sale value of the place. Better have a few cottonwoods than no trees, but it is not necessary to depend on the cottonwoods and the inferior Carolina poplar. Why not plant some of the slower growing but more permanent species and have the pleasure of watching them develop? Many trees from the following list are adapted to irrigated land up to 5,000 feet elevation. A number of these planted about the buildings and along the drives, setting them in groups rather than in rows, will give character to the farm home and will overcome the cheerless aspect so common in some places.

American and cork elms, linden, burr oak and pin oak, soft maple, Norway maple, green ash, white ash, black ash, honey and black locusts, European white birch, Russian olive, mountain ash, black walnut, Rocky Mountain red cedar, Colorado blue spruce.—B. O. Longyear, Colorado Agricultural College, Fort Collins.

### Don't Plant Diseased Potatoes

On account of the numerous potato diseases, which have been increasing, it would seem wise on the part of everyone who plants potatoes to make a thorough examination of the stock before planting. If one plants diseased potatoes they are committing a crime, because they are introducing disease in the community which, when once introduced, are likely to spread very rapidly and extensively.

# English Walnut Trees As Insurance

By Howard D. Pomeroy, Lockport, New York

A WRITER of the last century said: "The walnut tree is a forest patrician, supplying not only an admirable fruit but presenting in mien and figure the highest type of beauty, grandeur without ostentation, simplicity without effect, grace and truthfulness intermarried." He had reference to the English (Persian) walnut. We are assured on the authority of the late Professor John Craig that this was the tree referred to by King Solomon when, after saying, "I made my gardens and orchards and planted in them all kinds of fruit," he says, "I planted gardens of nuts." Surely a wise thing to do and another evidence of the wisdom of this anti-suffragette king.

The United States is a nut-consuming but not a nut-producing country to any commensurate extent. We import each year from various foreign lands nuts to the value of twelve to thirteen millions of dollars. This amount, many may be surprised to know, is more than the value of all the apples exported in any one year from both Canada and the United States. In proof of this, we have but to consult the records and find that since 1905 the largest export of apples from this country and Canada in one year amounted to slightly less than two and one-half millions of barrels. If, then, there is this demand for nuts in our country, if we as consumers buy more nuts than we sell apples, there are significant reasons for considering the culture of nuts under our own conditions. It would be easily possible, by going into detail, to place in array a long list of cogent and convincing reasons, but it is only necessary to give a few which are sound, sane and likely to obtain with increasing force as time passes. First, because nuts have a high food value. Second, because the domestic market is practically undeveloped and there is no reason why the opportunity for importing is better than the opportunity for exporting. Third, because nuts are not perishable. Fourth, because a mature English walnut orchard pays larger profits per acre, with less work and expense, than any crop of which we know. Fifth, because the amount consumed is steadily increasing and the price obtained is constantly advancing.

It is quite widely known that the English walnut thrives in some Western States; California is noted for its crop of nuts. A professor of an agricultural college of a Western State writes of the walnut industry: "It offers one of the finest fields for investment to be found. From the seventh or eighth year on the investment will pay good interest on a valuation of $1,000 per acre, and a good bearing orchard will easily bring that figure." Another Western authority of international fame for his knowledge on tree propagation states: "If on deep, well-drained land you will have in six or eight years a grove of walnuts which will pay at present, or even much lower prices, a most princely interest on your investment."

The Isere Valley, France, is the home of the Mayette, or Grenoble, English walnut. That is the variety which brings the highest price on the New York City market of any of the imported nuts. In this valley are growing thousands of walnut trees, but only a few are planted in regular orchard form; most of the trees are scattered along the roads, about the buildings, wherever it would be inconvenient to raise other kinds of crops. Even under these supposedly adverse conditions the hundreds of individual growers annually sell highly profitable crop which, in the aggregate, totals several thousand tons. If this one section of France can make such large returns so easily by utilizing what might be considered waste land; if the United States annually plants hundreds of thousands of trees for shade only along roads, drives and about buildings and in lawns; if the modern industry is to make land produce more food, then tree crops, and especially the meats that grow on trees, or English walnuts,

are entitled to all the attention and serious consideration they have received and more, much more.

Then the next point to consider is, can these trees be grown under Northern conditions, below-zero winters, with ordinary care and ordinary soil? The successful experiences of a nut grower of Lockport, New York, will be apropos. Daniel N. Pomeroy has doubtless done more there in the many years he has devoted to nut culture to encourage the growing of English walnuts in Northern States than any one individual. The father stumbled into an extremely fortunate discovery of a hardy variety of English walnuts. This happenstance occurred at the Centennial Exposition in 1876. It took time and several extremely severe winters before it was realized how distinctly hardy the trees were, but after receiving gold medals and other prizes and much favorable recognition, and the government naming the variety the Hardy Pomeroy English Walnut, the farm became the mecca and the inspiration of the many interested in useful ornamental trees and larger returns from orchards. Since then he has propagated many thousand hardy trees, planted and is planting more orchards and has supplied many hundreds of people in cold Northern States and Canada with trees of this hardy variety. At first the work was slow and difficult. Many expressed doubt, as it appeared unbelievable that English walnuts could or would successfully resist the rigors of severe winters. But now the many trees that have started bearing interesting crops of delicious thin-shelled nuts in New York State and other sections have removed the uncertainty and insured success. The great age to which English walnuts live and bear, beyond several generations, immunity from scale and unfailing market demand cannot but suggest them as an insurance.

Forrest Crissey, the well-known authority and writer on farming and economic subjects, toured the United States recently investigating English walnut orchards and conditions and visited the Pomeroy farm and afterward wrote: "There I found alternating rows of Hardy Pomeroy English walnut trees and peach trees. On every hand were peach trees killed out, root and branch, by the severe winter. There was not an English walnut tree in the whole orchard that showed the slightest injury from frost or from anything else. They were as bright as new dollars and as thrifty as any trees I ever saw. Then I saw the older trees with their loads of nuts. There was no question about the performance of those trees."

Country Life in America recently devoted considerable space to this hardy variety and said in part: "A young city man might plant half of a fifty-acre farm with English walnuts at no great expense with the assurance of an income from them which will give him a comfortable living; the farmer, too, may well appropriate this means of

providing against the time when he cannot be actively engaged in the field, and by making nut orchards of his unused acres he will after a term of years have a very respectable addition to his other farm products and profits which will come to him almost without any effort on his part. In fact the time is not far distant when a few far-sighted farmers in the East and North will be earning incomes which compare very favorably with those of the pecan orchardist of the South and the walnut and almond ranchmen of the Pacific Coast."

"When you plant another tree, why not plant the English walnut?" Luther Burbank has to say. "Then, besides sentiment, shade and leaves, you may have a perennial supply of nuts, the improved kind of which furnish the most delicious, nutritious and healthful food which has ever been known. The consumption of nuts is probably increasing among all civilized nations today faster than that of any other food; and we should keep up with this growing demand and make it still more rapid by producing nuts of uniform good quality, with a consequent increase in the health and a permanent increase in the wealth of ourselves and neighbors." Our ancestors may have been careless or unwise in some ways, but at least they did not have the advantages of the knowledge of arbor culture possessed by this generation and we must remember this fact—posterity will have something to say about our choice and judgment in trees and orchards planted now.

### Soil Texture and Movement of Soil Moisture

Mr. James D. Marshall of the Colorado Agricultural College gives some interesting information in reference to soil texture movement and moisture, stating that the term "texture" applied to the soil refers to the size of the soil particles. There are three main classes of soil based on texture, viz., sand, silt and clay. All productive soils as a rule are composed of a combination of the above classes. The amount of the movement and the rate of movement of soil moisture are governed largely by texture. In sand movement is more rapid, but lasts a shorter time. On the other hand, in clay soils water moves slower, but through greater distances. In soils of medium texture that are not extremely sandy or extreme clay the moisture movement is intermediary, and consequently such soils are easier to maintain a comparatively even moisture condition throughout the growing season.

## Fertilization of Apple Orchards

Continued from page 12

and potash are the only materials that have consistently benefited size. This influence of manure is doubtless very largely due to its mulching effect, since moisture makes up about 84.6 per cent of the fruit on the average. The potash influence also, so far it is a definite benefit, is probably exercised through the same medium, inasmuch as potash is credited with some ability to increase the osmotic power of the cells and thus enable them to compete more successfully for whatever water is present. There is also a distinct possibility that the apparent benefit of potash on size may be largely due to the fact that it is associated with much lower yields than the other materials, especially nitrogen. Conversely, the failures of the latter to increase size may likewise be due to association with markedly increased yields.

We believe, however, that with a normal moisture supply and sufficient growing season, the dominant influence controlling size in apples is the number of fruits on the trees after this number has passed a certain "critical point." This point, however, is relatively high, our data showing that even on trees up to fifteen years of age little or no correlation appeared until the number of fruits had reached 1,400 or more per tree. Above this point, proper thinning is the most important means of increasing the size of the fruit. Below it, the size can usually be markedly affected by moisture supply, cultural methods, manure and possibly by fertilizers, especially those rich in potash. The latter factors may also co-operate in such a way as to materially raise the critical point. In general, however, proper thinning and moisture conservation are the most important means of improving fruit size.

The Control of Fruit Color.—In Table V it will be observed that none of the fertilizer treatments have resulted in any marked improvement in color. Slight and irregular benefits are shown by potash and by some of the phosphate applications, but nothing of any importance. The same is true of iron applications so far as experimental evidence is concerned. These facts naturally lead up to the general proposition that color in apples cannot be materially increased by fertilizer applications, and that their red colors are essentially dependent upon maturity and sunlight. Conditions that tend to increase one or both of the latter factors, such as late picking, open pruning, light soils and sod culture tend to increase the red color. Opposite conditions decrease it. These propositions make it clear why the nitrates and manure indirectly retard color development. It is simply done by retarding maturity and diminishing the available sunlight, as a result of the increased density of foliage. This was verified in 1911 by leaving the fruit on the nitrate plats in the Johnston orchard until it had reached approximately the same degree of maturity as

that attained by the checks when their fruit had to be picked on account of dropping. The delay required was fully three weeks,—from September 29th to October 19th, and even then the nitrate fruit was picked with much more difficulty than that on the checks, besides showing a much lower percentage of fruits dropped. But the amount of color on the nitrate plats at the later date was actually greater by 10 per cent than that shown on the checks at the time of picking. The occasional marked increase that sometimes occurs in color as a result of spraying is largely explainable on similar grounds. The sprays reduce the worminess and thus enable the fruit to remain longer on the tree. It also may reduce the amount of foliage somewhat as a result of spray injury, thus permitting more light to reach the fruit. In general, however, in improving color, chief reliance must be placed on those methods that tend definitely to secure fuller maturity on the trees and to get the maximum amounts of light to the fruit.

Assuming that the above experimental results are fairly general in their application,—and recent data from other states apparently bear this out,—it is evident that more nitrogen and less potash than is commonly recommended should be used on the average orchard in need of fertilization. It is also evident that no advice can be given that will fit all cases. To meet the immediate needs of those desiring information, however, we suggest the following fertilizer for general use, until the requirements of the particular orchards involved can be determined more fully by the plan indicated below. The ingredients of this general fertilizer are stated in amounts per acre rather than in amounts per tree, because of the varying numbers of trees that are planted on an acre. The amounts per tree are readily obtainable, however, by dividing the present weights by the given number of trees per acre. For young trees, these amounts may be reduced approximately in proportion to the reduction in area of soil covered, making this area correspond with the lateral distribution of the roots so far as possible.

Table VII means that a fertilizer carrying about 30 pounds of actual nitrogen, 50 pounds of actual phosphoric acid ($P_2O_5$) and 25 to 50 pounds of actual potash ($K_2O$) should be applied to an acre of bearing trees. Unless potash is known to be lacking, the smaller amount should be used, or after a little testing it may even be omitted entirely. With the smaller amount of potash, the essentials of the present combination are carried in 500 pounds of a fertilizer containing 6 per cent of nitrogen, 10 per cent of phosphoric acid and 5 per cent of potash or its equivalent. In the usual ready-mixed fertilizers, the nitrogen is likely to be carried in ammonium sulphate, or less available forms, with which some liming may be necessary if many applications are made, and especially if leguminous cover crops or permanent covers are

desired. In special or in home-made mixtures, the various elements may be carried in any of the materials indicated in the table. In the experiments referred to above, the nitrogen is carried in the combination of nitrate of soda and dried blood indicated in the table. This combination carries about equal amounts of nitrogen in each material, and it thus gives a quick action as well as one that is prolonged well through the season. Similar effects could doubtless be secured by a second application of nitrate later in the season. The nitrogen may also be secured, wholly or in part, by the use of stable manure or leguminous plants where they are available. The latter plants, however, have proved rather disappointing in their net effect on the trees in nearly all our experiments that bear directly upon their value. In the case of the other carriers indicated in the table, we have very little evidence on their relative values as yet, and hence those that are actually least expensive or most convenient should be chosen. All applications should be made annually, subject to the variations indicated below.

Time and Method of Application.—The time of application is of distinct importance, especially in the case of nitrates. The evidence on this is by no means complete, yet there are some indications that nitrates can easily be applied too early in the season and thus be wholly lost to the tree. Other evidence leads to the opinion that distinct harm may result from their application about fruit-setting time,—especially in the case of the peach. We feel, therefore, that the nitrates should be applied not earlier than petal fall in apples, and probably not later than the middle of July. In general, about the middle of this period should be satisfactory. The minerals can be applied at any time without danger of material loss, hence we apply them along with the nitrogen. The manure may well be applied some time during the spring, and eight tons per acre annually make an ample application. One advantage of the delayed application of the commercial materials is that it gives an opportunity to vary the rate somewhat in accord with the size of the crop set on the trees. When the crop is light smaller applications are required, because of the natural tendency of the trees to develop a sufficient number of fruit buds in the off season. In the full years, on the other hand, the applications should be rather liberal in order to prevent the total absence of a crop the following year, and in the long run to steady the yields. In making the applications, we have simply scattered the fertilizer or manure broadcast over the surface of the ground, taking care not to get it too close to the trunk, where there are few absorbent roots, and extending the applications well out beyond the spread of the branches. To conform more closely with the distribution of feeding roots, the rate of application is made heaviest in the central part of this





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area, or in general it is applied most heavily under the outer two-thirds of the spread of the branches. This fertilization may either be left on the surface to be washed in by the rains or it may be harrowed or lightly plowed into the soil. With this done, one should remember that the fertilizer applied in any given season cannot materially affect the yield of that year, since the fruit buds are formed in the latter part of the preceding season. Important results, therefore, should not be expected before the following season, at the earliest, and they may not appear until considerably later and still prove of value.

Adjusting the General Fertilizer to Loeal Needs.—The general fertilizer indicated above is for use only until the exact needs of the particular orchard can be determined. In other words, it is intended only to meet the immediate demands. If in the meantime one wishes to determine just how to fertilize his own orchard he can do so by following the plan outlined below. This plan is especially adapted to the needs of commercial orchardists and to "community" tests on the part of the smaller growers. Like other things of value, a test of this kind requires some work, but as yet it is the only way that one can become really acquainted with the needs of his orchard, and where the income from the latter is important the time thus spent should be most profitable.

PLAN FOR LOCAL ORCHARD-FERTILIZER TEST

(Pounds of fertilizer for a mature tree in bearing)

1. Unfertilized plat.
2. Nitrate, 2½ lbs.; dried blood, 3½ lbs.; acid phosphate, 10 lbs.
3. Nitrate, 2½ lbs.; dried blood, 3½ lbs.; potash, 2 lbs.
4. Acid phosphate, 10 lbs.; potash, 2 lbs.
5. Unfertilized plat.
6. Nitrate, 2½ lbs.; dried blood, 3½ lbs.; acid phosphate, 10 lbs.; potash, 2 lbs.
7. Same as No. 6, plus lime, 12 to 25 lbs.
8. Manure, 400 lbs.
9. Unfertilized plat.

The plats selected for this test should be located in a typical part of the orchard, and should include at least six average trees of the same variety and age for each formula. They should preferably be laid out in double rows of three trees each, and if two or more varieties are involved each plat should be arranged to include equal numbers of each variety. All trees should be labeled and carefully measured at a fixed point on the trunk, and definite records of their yields and growth should be kept for at least three years. As already indicated, a good idea of the needs of an orchard may often be obtained in less time, but this time at least should be allowed and more should be used if necessary.

The materials for this experiment are indicated in quantities proper for each bearing tree instead of in amounts per acre, as above, and the same proportionate reductions should be made for younger trees. In other words, if only one-third of the ground is to be covered, then only one-third of the amount of fertilizers recommended should be used, so that the rate of application





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may be kept within proper bounds. The careful operation of this test for the period suggested in any orchard should readily determine whether fertilization really pays and which of the principal fertilizer elements is most important.

## Orchard Sprays

Spraying for codling moth and other insects and fungous diseases that may be present at the time will to a large extent be measured by the degree of care that is exercised in preparing the solutions. Spraying is hard work, and it is right and proper to use combined sprays where possible to avoid going over the orchard a second time.

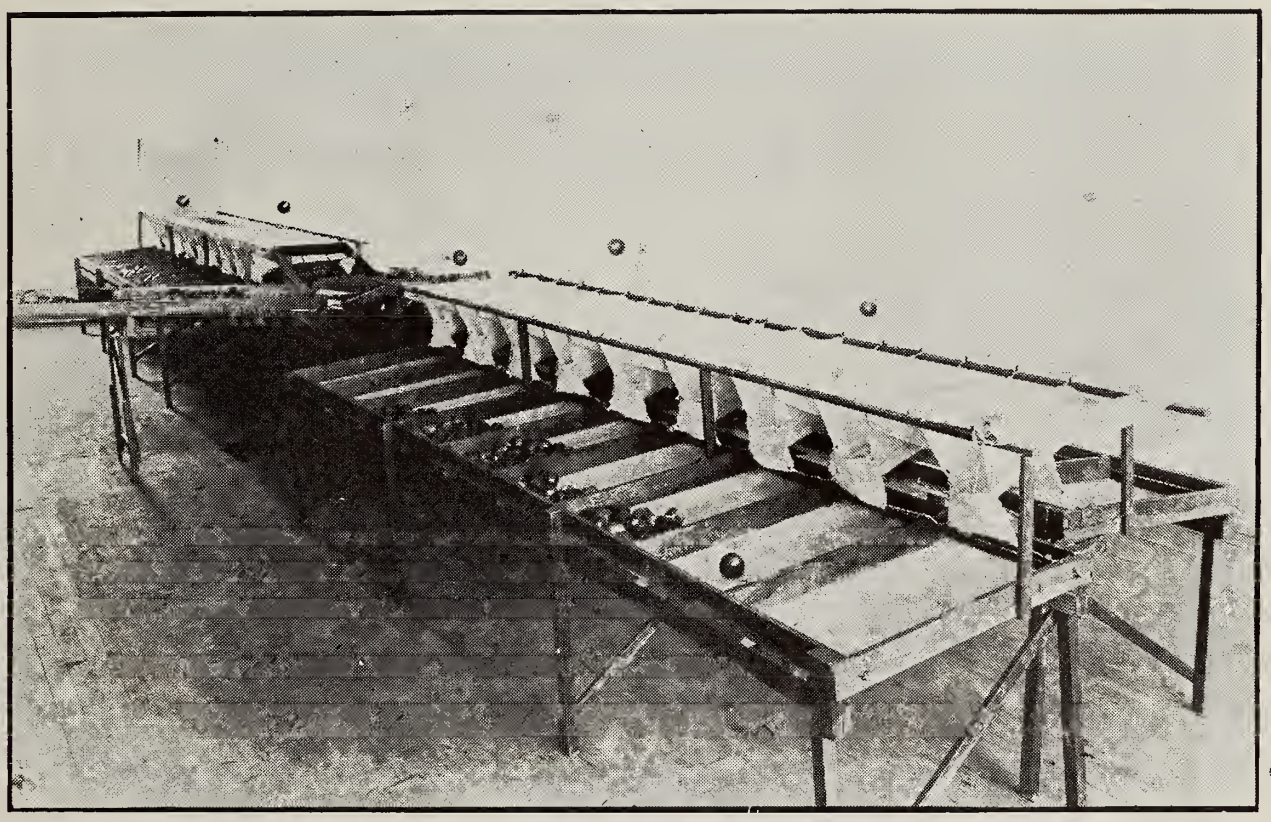
The lime-sulphur, so commonly used for fungous diseases and insect pests, can be used successfully in combination with lead arsenates, making a combined spray that holds in check the aphis, apple scab and similar diseases, also the codling moth. The proper method of making this combined spray is to place the lime-sulphur in the spray tank first, then fill with water, and after this has been thoroughly mixed add the arsenate of lead, which has been reduced to a very thin paste or heavy liquid, and as soon as it is added to the lime-sulphur solution the entire mass should be stirred vigorously and continuously during the entire time that the tank of liquid is being applied. If the arsenate of lead is added to the concentrate lime-sulphur it frequently makes trouble in the spray pump by gumming and clogging the pump and proves inefficient as a spray solution. (Write State Experiment Station, Pullman, for bulletin on spraying.) A tobacco spray can be added to an arsenate of lead spray, or to a lime-sulphur spray, or these three materials can be used in one solution, making a very satisfactory combined spray. The tobacco spray cannot be used satisfactorily with bordeaux mixture or with paris green sprays.

With sprays properly prepared and applied, satisfactory results are usually obtained. There is a strong tendency to use more arsenate of lead than is necessary. Two pounds of arsenate of lead for each hundred gallons of water has practically always in practical work given good results. The arsenite of zinc is a much stronger poison than the arsenate of lead and frequently burns or scorches the foliage during the damp weather. It is efficient in controlling the codling moth, but has this one fault. Lime-sulphur does not lose its strength by standing, provided it has been kept in closed vessels. The commercial solution in ordinary strengths does not crystallize out or change in its chemical composition. Barrels of this material left over from last year are perfectly satisfactory for this year's work.—O. M. Morris, Horticulturist, Washington State Experiment Station.

# The Four-Cup Price Fruit Sizer

We want the readers of this advertisement to understand at the beginning that we have scoured the English vocabulary for words (simple ones) that mean what we say, and say what we mean. We are not like the illiterate Frenchman who, when he sold a horse to the minister, and was afterwards accused of its being blind, said, "Yes, that's the word; but I told you he don't look very good." We want words and sentences that can have only one meaning. We don't want subterfuge, and we want you, reader, to know that what we say here is true, practical, applicable, honest and sincere, so think over what we say.

Mr. W. G. Price, the inventor of this machine, has had over one hundred patents issued to him; he has been with the government corps of expert army engineers and other highly specialized industries for years. He is a mathematician, engineer and scholar. We tell you this so that you may know that this machine is not the product of a dreamer, or of one unskilled.



## NOW THEN

**Our Motto:** To reduce the cost of putting fruit in the box, so that even a child could do the work and obtain the perfect pack. This machine will save you from three to five cents on every box of apples that you pack; enable you to get a perfect pack, and have every apple in the box the same size; enable you to get the proper bulge, tightness, and do away with over tight and too loose packs; the only machine on the market that does away entirely with expert packers; enables expert packers to double their output and to do better work. The apples are in full view in the bins, so that you can check up your help as to sorting and grading at all times, which you cannot do when apples are sorted from box to box. The only machine on the market that sizes your apples into the twenty Northwest standard packs, and will handle two grades at the same time, doing away with 80% of your crop at one handling, and has a capacity of 1500 boxes per day. It will handle apples, pears, peaches, oranges, onions, potatoes or any other fruit or vegetable that needs to be sized. It will handle fruit as delicately as a woman's touch. **We are demonstrating with eggs to prove its non-bruising qualities.**

Five thousand boxes will save you the price of the big machine the first season, and give you a better pack than you have ever been able to put up before. Twenty-five hundred boxes will save you the price of the medium machine. This Sizer is made in units, so that they can be added to at any time. Write us for further information, and we will cheerfully send illustrations, testimonials and more detailed explanations, and please mention "Better Fruit."

## Price Fruit Sizer Company

Designers and Manufacturers of Throwing Machines for Sizing and Sorting Apples, other Fruits, Vegetables and Nuts.

**Works and General Sales Office, North Yakima, Washington, P.O. Box 934, Office No. 1 North Second Street**

W. G. PRICE, President. W. K. PRICE, Manager Works. J. W. LAVIGNE, Sales Manager.

THE WORLD OUR ORCHARD

*The Fruit Merchant is unquestionably the aristocrat of the commercial world, for it is he who deals in and distributes not only the most beautiful but, also, one of the most useful products of nature.*

# Apples in Boxes

The biggest element of value in the Northwestern box apple to everybody concerned is **STABILITY.**

Growers have not only made it standard by methods of culture and packing far beyond anything previously known in connection with the fruit, but have provided a complete range of standard varieties that makes the product staple in the market all year round, and over a large part of the world.

It is this element of **STABILITY** more than anything else that gives the Northwestern box apple the preference with purchasers of fine table fruit. It is bought for its trustworthy standards as much as for its quality, and proof of this is found in the fact that any lowering of standards would quickly destroy the trade.

**STABILITY** is the biggest element of value in the Northwestern box apple **TRADE.**

For with a standard product the true merchant can step in and perform his service. Mercantile service is as indispensable to producer and consumer as the service of transportation. For the true merchant cultivates the demand. He finds it, stimulates it, conserves it, increases it. He deals with the purchasing public at close range and makes good any falling off in the standards, accidental or otherwise. He combines the best in one product with the best in allied products, making himself a permanent trade center to which the purchasing public will find it most convenient to turn year after year, not only for supply, but for responsibility. And he holds the producer up to the present standards and constantly sets new ones before him.

In connection with the Northwestern box apple,

## STEINHARDT & KELLY

have performed the function of true merchants.

To the purchasing public they bring the best fruit the world affords.

And to the grower who realizes the immense importance of **STABILITY** and who has seen the demoralizing effects of speculative marketing, they offer an outlet that is available year after year, of ever-growing capacity, and which more than anything else, possibly, has established for the best packs of Northwestern box apples those rational, non-speculative f.o.b. prices which are absolutely necessary for the future growth of the trade.

There will always be fashions in marketing, and it it will always be in human nature to demand that new experiments be tried.

## STEINHARDT & KELLY

believe, however, that the growers in the Northwest who see furthest, understand the mercantile trend of the trade as clearly as themselves, and that therefore they can continue to depend upon the co-operation of the grower who conducts his plant as a staple business for the fine fruit that is necessary in extending their trade as a staple business.

# Steinhardt & Kelly
## NEW YORK

OUR MARKET THE WORLD